



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

TC784 N21



CHAPTER IV.

ESTIMATE OF THE EXPENSE OF CONSTRUCTING THE CANAL.

According to what we have already stated, there are three distinct places where works are to be undertaken :

Firstly,—On the river San Juan ;

Secondly,—On the river Tipitapa ;

Thirdly,—At the Isthmus between the lake Leon, and the Pacific ocean.

We will also follow the estimates laid down by Mr. Garella, for analogous works projected at Panama, but we must remark that the prices mentioned by this engineer are exceedingly high : for instance, he calculates at three francs (about two shillings and sixpence) a day, the wages of a labourer ; whilst we know, that at Grenada and Leon they are as low as sixpence.

According to our former statement, the works required on the San Juan, are as follows :

Works on the River San Juan.

At the river San Juan : ten <i>barrages</i> locks at £24,000.	£ 240,000
51,040 yards of the bed of the river to be deepened and cleared (reckoning 90 cubic yards per running yard) by steam-dredging machine ; we find 4,593,600 cubic yards, at 1s. 6d.	344,520
6866 yards to be subjected to mining operations at £16 per running yard	109,856
Towing-path, at 16s. per running yard, upon an extent of 183,040 yards	146,432
Damming the Colorado	

Total cost of works on the San Juan

E. Napier and Ill. the project of the Canal

CANAL OF NICARAGUA:

OR, A

PROJECT TO CONNECT

THE

ATLANTIC AND PACIFIC OCEANS

BY MEANS OF A CANAL.

BY N. L. B.

LONDON:

PRINTED BY MILLS & SON, CRANE-COURT, FLEET-STREET.

1846.

[NOT PUBLISHED.]

TC 784
N21

15⁰⁰ net
D208

CONTENTS.

APPENDIX, No. II.

Comparison between voyages to be made through the Canal of Nicaragua and those actually made <i>via</i> Cape Horn, and the Cape of Good Hope	56
--	----

MAPS.

- No. I.— Map of the World.
 - No. II.—Map of Central America.
 - No. III.—Map of the Republic of Nicaragua, and Chart of the Har-
bours of Realejo and San Juan.
-

INTRODUCTION.

IN the year 1842, several influential persons of Central America wrote to the prisoner of Ham, through a French gentleman established in Jamaica, with a view of inducing him to ask for his liberation, and proceed to America, where, as they said, the Prince would be welcomed with enthusiasm, and would find occupation worthy of his name and active mind. This offer Prince Napoleon Louis Bonaparte at that time declined. Touched, however, by such marks of sympathy, shown to him from a country so distant, even through the gates of his prison, the Prince continued in correspondence with those gentlemen.

The more closely the body is confined, so much the more is the mind disposed to wander in unbounded space, and to canvas the feasibility of projects which it would scarcely be at leisure to entertain in a more active existence; thus the Prince, having received a visit from an officer of the French navy, who was about to start for Central America, directed him to make observations on the practicability of cutting a ship-canal that should join the Atlantic and Pacific oceans, through the lakes of Nicaragua and Leon. It is remarkable that nearly at the same time that Prince

Napoleon was directing preliminary observations to be made on the line of country through which a ship-canal could be undertaken with a greater chance of a profitable result, the French government sent an engineer (Mr. Garella) to make the surveys for a contemplated cutting across the Isthmus of Panama.

In the year 1844, the States of Guatemala, St. Salvador, and Honduras, sent Mr. Castellon, as minister plenipotentiary to King Louis Philippe, with directions to request for those states the protection of the French government, and offering in return many commercial advantages in favour of France. The French government declined the proposals made by Mr. Castellon, who then asked for a permission to visit the prisoner of Ham. His wish being complied with, Mr. Castellon had an interview with the Prince, during which he entered at great length upon the importance and possibility of joining the two oceans, urging him to go to Central America, and place himself at the head of this gigantic enterprise; but his exertions proving unsuccessful, he subsequently signed a treaty with a Belgian Company.

A few months had elapsed, when rumours of a forthcoming amnesty began to circulate. The Prince apprehending that he would not be allowed to visit his father in Florence, again thought of America, and revolved in his mind the great project recently laid before him, the accomplishment of which would reflect such high credit upon his name.

Mr. Castellon, during his stay at Ham, discovered that the Prince possessed an intimate knowledge of all points in connection with the project under consideration, and was fully alive to the importance to which his country was destined to attain at no distant

period, and he therefore desired that the Prince would reduce to writing the ideas which arose in his mind on the subject. In compliance with that gentleman's request, the Prince forwarded to him in America certain memoranda, embodying several of the considerations which will be found in this pamphlet ; and he stated, at the same time, that it was his decided intention, should he be set at liberty, to go to America, and place himself at the head of this undertaking. At that time, the Prince's father had taken no step to obtain his son's liberation. His health had not up to that period been impaired, as it has been since, and the difficulty subsequently opposed by the French government to the liberation of the Prince could not have been anticipated.

On receiving from Louis Napoleon the communication alluded to above, Mr. Castellon caused it to be translated into Spanish ; and no sooner was it made known throughout the country, than a great number of the principal inhabitants petitioned their government to the effect, that Prince Napoleon Louis Bonaparte should be exclusively entrusted with the execution of the projected ship-canal. Accordingly, on the 6th of December Mr. Castellon wrote to the Prince the following letter :—

(Translation.)

“ To his Highness Prince Napoleon Louis Bonaparte.

“ PRINCE :

“ Leon de Nicaragua, 6th Dec. 1845.

“ It is with the greatest pleasure I acknowledge
 “ the receipt of your Highness's letter, dated the 12th
 “ of August, containing the expression of sentiments of
 “ friendship and esteem with which I feel highly ho-
 “ noured. Annexed to it I found the development of
 “ your ideas relative to the canal of Nicaragua, viewed
 “ by you in that light which is best calculated to pro-

“ mote the welfare of Central America. You, at the
 “ same time, acquaint me that you are far more disposed
 “ than when I first paid you a visit at Ham, to come to
 “ this country in order to advance, by your presence
 “ and exertions, the execution of that great work, suffi-
 “ cient of itself to satisfy the most noble ambition ; and
 “ that you are ready to accept the necessary powers for
 “ its execution, without any other view than that of
 “ performing a task worthy of the great name you
 “ possess.

“ Before I enter upon that great object, of paramount
 “ importance to the welfare of my country, I beg your
 “ Highness will allow me to say, in reference to the flat-
 “ tering opinions which, notwithstanding my deficiency
 “ of merit, you express in my behalf, that nothing proves
 “ more the magnanimous and benevolent disposition of
 “ your heart, than this distinguished mark of esteem
 “ and regard with which you have honoured me. I feel
 “ happy in having obtained from you so favourable a
 “ reception, and I can assure your Highness, that I will
 “ seize upon every opportunity in my power, to testify
 “ my gratitude to you, as well as my most hearty desire
 “ to reciprocate the bounty you have shown to me.

“ I beg now to resume the object now before us.

“ When I went to France, some time ago, as minister
 “ plenipotentiary to his Majesty the King of the French,
 “ I was anxious, before leaving Europe, to pay you a
 “ visit at Ham. I longed for the honour of seeing you,
 “ not only on account of the popularity which invested
 “ your name throughout the world, but also because
 “ I had myself witnessed the high esteem in which
 “ your character was held in your own country, and the
 “ sympathy exhibited for your misfortunes.

“ It was also my wish, Prince, to prevail upon you to
 “ come to my country, fully convinced that you would
 “ find there an admirable opportunity for the display of

“ your activity, and the exercise of your talents, which
 “ continued captivity might exhaust. I admired, Prince,
 “ your resignation, and the love of your native land,
 “ standing even the test of imprisonment ; but it was
 “ with great pleasure that I saw your mind exalted at
 “ the recital of the immense work to be executed in my
 “ country for the general advancement of civilization.

“ I am happy to see by your Highness’s letter, that
 “ you feel disposed to come to this country, where the
 “ documents you have forwarded to me have elicited
 “ sentiments of the deepest gratitude, and of the live-
 “ liest enthusiasm.

“ Now, I am happy to be enabled to acquaint your
 “ Highness, that the government of this state, fully
 “ convinced that the capital necessary to this under-
 “ taking could only be raised by placing at its head
 “ one who, like yourself, is independent both by for-
 “ tune and standing, and thereby inspiring a general
 “ confidence in the two worlds, whilst it dispels from
 “ the easily-alarmed spirit of our people every fear of
 “ foreign domination,—this government, I say, relies on
 “ the co-operation of your Highness, as the only person
 “ combining in the highest degree these different quali-
 “ ties. Brought up in a republic, your Highness has
 “ shown by your noble behaviour in Switzerland, in
 “ 1838, to what extent a free people may rely upon
 “ your self-denial, and we feel convinced that, if your
 “ uncle, the great Napoleon, has rendered himself im-
 “ mortal by his military glory, your Highness may
 “ acquire, with us, an equal glory, in works of peace,
 “ which cause only tears of gratitude to flow.

“ From the day on which your Highness shall set foot
 “ on our soil, a new era of prosperity for its inhabitants
 “ will commence.

“ That which we beg leave to propose to your High-
 “ ness, is not unworthy your attention, for, previous to

“ the year 1830, King William of Holland had accepted
 “ a proposal analogous to that which we have the
 “ honour now to submit to your consideration.

“ If we do not at once forward to your Highness the
 “ powers necessary to the immediate progress of this
 “ great work, this is to be ascribed to the recess of the
 “ legislative Chambers, which have yet to take into
 “ consideration the terms of a treaty signed by me on
 “ the 2nd December last year, with the Count of
 “ H * * * *, president of the Belgian Colonization Com-
 “ pany. But, this treaty not having been so favourably
 “ received as I had reason to expect, there is a greater
 “ probability of the government being enabled to renew
 “ its proposals to your Highness, and thereby satisfy
 “ the wishes of our people.

“ The most influential persons of this capital, distin-
 “ guished both by their learning and their wealth, have
 “ presented to the government a memorial, which I
 “ shall hand to our friend Mr. * * * *, recommending
 “ that your Highness be intrusted with the final settle-
 “ ment and terms of the pending negotiation, or of any
 “ other which might hereafter present itself,—intended
 “ to promote the welfare of the state of Nicaragua. The
 “ government has not rejected the suggestion, but it
 “ appears that, at all events, it will feel disposed to
 “ send me to you with the necessary instructions, to
 “ enable your Highness and myself to come to an
 “ understanding on the subject.

“ Another cause of delay, is the recent popular out-
 “ break in the country ; but the number of malcon-
 “ tents being exceedingly small, and the government
 “ supported by public opinion, I think that this revolu-
 “ tion will soon be appeased, and the government will
 “ be able to display all the elements upon which it
 “ relies, to insure permanent peace, and to give this
 “ project the strong impulse it justly demands. The

“ government is moreover convinced, that the construction of the canal, by giving employment to all those hands which are now unoccupied, will contribute efficaciously to the tranquillity and good of the people, harassed, for a long time, by the horrors of civil war.

“ As much from a desire of bringing to a favourable issue this important matter, in which I am especially disposed to co-operate with all my ability, as well as from an ardent hope of seeing your Highness ruling the destinies of our country, I long for the honour of paying you, were it but for a few hours, a visit at Ham, which I quitted, last year, full of grief at the prolongation of a captivity, from which I earnestly prayed God to grant you a speedy release.

“ I beg that your Highness will continue to honour me with your correspondence, and that you will accept the expressions of my respectful sentiments.

“ FRANC. CASTELLON.”

A few months after this communication, the Prince received at Ham a letter from Señor del Montenegro, Minister of foreign affairs, conferring on him, officially, all the powers necessary for the organization of a company in Europe, and apprising him that the government of Nicaragua, by decision of the 8th January, 1846, had determined to give to that great work, which is to open a new route to the commerce of the world, the name of *Canale Napoleone de Nicaragua*; in consequence of that decision, Señor De Marcoleta, *Chargé d'affaires* of that country in Belgium and Holland, having received official instructions from his government, went to Ham, for the purpose of signing a treaty with the Prince, conferring upon him full power to carry into effect the object in view.

Pending this negotiation, active, but unsuccessful

steps were taken in Paris for the release of the Prince ; who, before adopting the last resource, being determined to exhaust all means, consistent with his honour, by which his liberation could be obtained, and which would enable him to gratify his filial affection by a visit to his aged and infirm father, at Florence, informed the French Government of the proposition he had received from America, pledging himself that, in the event of his receiving permission to reside for a few months in Tuscany, he would afterwards proceed direct to America for the purpose specified.

This request having met with absolute silence, the Prince immediately determined, if possible, to accomplish his escape.

Prince Napoleon has been residing in England for the last two months, waiting every day for permission to proceed to Florence ; but an insane policy has always opposed obstacles to his receiving the last blessing of his aged father, who died at Florence on the 25th July last, without once more embracing his son. Now that the Prince finds himself again an exile, he is still farther from relinquishing the idea of an enterprise so strongly pressed upon him, and, in order to respond to the expressions of confidence adopted by the Government of Nicaragua towards him, even when a captive, it will be his object, during his stay in this country, to secure the co-operation of all persons of enlarged and intellectual minds in an undertaking, which must produce the most beneficial effects on the Commerce of all nations.

THE EDITOR.

THE CANAL OF NICARAGUA.

CHAPTER I.

IMPORTANCE OF THE GEOGRAPHICAL SITUATION OF THE STATE OF NICARAGUA, AND LINE OF COUNTRY THROUGH WHICH THE CANAL IS TO BE CUT.

THE junction of the Atlantic and Pacific Oceans, by means of a Canal crossing the centre of the New World, is a question of acknowledged importance ; it will diminish, by three thousand miles, the distance that separates Europe from the whole of the western coast of America and Oceania ; it will render the communication with China, Japan, New Zealand, and New Holland, speedy and easy, by means of steam-boats ; it will elevate immediately, to a prodigious degree of prosperity, those countries through which such an undertaking must draw annually two or three thousand merchantmen ; it will open new channels to the introduction of European produce ; in a word, it will advance, by several centuries, the progress of Christianity and civilisation throughout the half of the globe.

This undertaking is alike favourable to the interests of humanity generally, and of America in particular. This being conceded, it remains to determine under what conditions a ship Canal is best calculated to develop European commerce, and the prosperity of Central America ; if we prove that there is but one particular route which can satisfy at once these two-fold interests, and that this route presents the fewest difficulties, and

requires the least expense, we shall have considerably simplified the problem.

Central America may be considered as a great isthmus, which separates the Atlantic from the Pacific Ocean, beginning at the isthmus of Tehuantepec and finishing at the gulf of Darien. (*See the Maps Nos. I. and II.*) The extent of its coasts is about 1200 miles; its superficies measures 26,650 square leagues, nearly as large as that of the French territory; its population is three millions. The natives derive their origin from the ancient Spaniards and Ladinos, as well as from the aboriginal Indians; and there are no slaves. The north of Central America belongs to Mexico, the southern part belongs to New Grenada, and the centre forms the republic of Guatemala, which, in 1823, constituted itself in a federal form, composed of five states,—Costa Rica, Guatimala, Honduras, Nicaragua, and St. Salvador. At present, these states are independent of one another; but in their diplomatic relations, Honduras, St. Salvador, and Nicaragua, act with the same understanding. According to Thompson and Montgomery, extensive tracts of land, having a beautiful climate, advantageously situated and possessing a most extraordinary fertility, are still uninhabited, and entirely left to themselves. There are also immense forests, the working of which will yield immense profits to any active persons who will undertake to do so. Such is the fertility of the soil, that they can raise three crops of every kind of corn in one year, especially of maize, which produces from one hundred to five hundred for one. All the productions of hot and temperate climates prosper in it. The temperature is as diversified as the surface of the country: the coasts, and low grounds which are near the sea, have the benefit of the tropical heat, whilst on the heights, and inland, we find a perpetual spring. The production of fruits, as well as of crops of every

kind, takes place without any interruption. In the plains and valleys the soil is formed of *alluvial* matter, five or six feet deep: it is rich enough to serve as manure to less fertile lands. (*For additional particulars, see the Appendix, No. I.*)

It is in this part of the *American* continent, that five principal points have been proposed, as eligible for the opening of a communication between the two seas. The first, on the northern side of Central America, on the Mexican territory, through the isthmus of Tehuantepec; the second, through the isthmus of Nicaragua; the third, through the isthmus of Panama; and finally, two other projects, through the gulph of Darien. (*See the Map, No. II.*)

Of these, the passage through the isthmus of Tehuantepec presents, according to the surveys of General Orbegoso, almost insuperable difficulties. According to Mr. Moro, these difficulties appear to be surmountable, but at an immense expense; for, although his estimate is but 3,334,000 pounds sterling, still, if we give to his surveys the valuation of Mr. Garella, the engineer directed by the French government to make the survey through the isthmus of Panama, we find the whole amount to be nearly 8,000,000 pounds sterling.* Moreover, this canal would have the immense disadvantage of opening into the gulf of Mexico, dangerous to navigation, and also of lengthening, by several hundred miles, the route to South America; besides which, the ports situated at the two ends of the canal would not be

	Francs.
* 1st, for earth works, 90 kilom. at 500 francs . . .	45,000,000
2nd, 150 locks, at 600,000 francs each . . .	90,000,000
3rd, deepening of marshes	11,200,000
4th, deepening of the Guazacoalco	34,500,000
5th, Ditches, 30 kilom. at 25 francs	750,000
	181,450,000
	or £ 8,000,000 sterling.

so good as those through Nicaragua, the country itself presenting no such advantage of colonization, or chance of prosperity. The opinions collected by Mr. Michael Chevalier, are quite unfavourable to the adoption of the two proposed routes through the gulf of Darien.

There remain only two available projects ; one by the isthmus of Panama, the other by the river San Juan and the lakes of the state of Nicaragua. Now, even if the whole of the above-mentioned projects were available, we maintain that the last stated is the only one that should be adopted, inasmuch as it is the only one conducive to the real interests of Central America, and the world at large. A few preliminary observations will elucidate our position.

There are certain countries, which, from their geographical situation, are destined to a highly prosperous future : wealth, power, every national advantage flows into them, provided that where nature has done her utmost, man does not neglect to avail himself of her beneficent assistance.

Those countries are in the most favourable conditions which are situated on the high-road of commerce, and which offer to commerce the safest ports and harbours, as well as the most profitable interchange of commodities ; such countries finding in the intercourse of foreign trade illimitable resources, are enabled to take advantage of the fertility of their soil, and, in this way a home trade springs up, commensurate with the increase of mercantile traffic. It is by such means that Tyre, Carthage, Constantinople, Venice, Genoa, Amsterdam, Liverpool and London, attained to such great prosperity, rising from the condition of poor hamlets to extensive and affluent commercial cities, and exhibiting to surrounding nations the astonishing spectacle of powerful states, springing suddenly from unwholesome swamps and marshes. Venice, in particular, was in-

debted for her overwhelming grandeur to the geographical position which constituted her for centuries the entrepôt between Europe and the east ; and it was only when the discovery of the Cape of Good Hope opened a ship passage to the latter, that her prosperity gradually declined. Notwithstanding, so great was her accumulation of wealth, and consequent commercial influence, that she withstood for three centuries the formidable competition thus created.

There exists another city, famous in history, although now fallen from its pristine grandeur, so admirably situated as to excite the jealousy of all the great European powers, who combine to maintain in it a government so far barbarous, as to be incapable of taking advantage of the great resources bestowed upon it by nature. The geographical position of Constantinople is such as rendered her the queen of the ancient world : occupying, as she does, the central point between Europe, Asia, and Africa, she could become the entrepôt of the commerce of all these countries, and obtain over them an immense preponderance ; for in politics, as in strategy, a central position always commands the circumference. Situated between two seas, of which, like two great lakes, she commands the entrance, she could shut up in them, sheltered from the assaults of all other nations, the most formidable fleets, by which she could exercise dominion in the Mediterranean as well as in the Black Sea, thereby commanding the entrance of the Danube, which opens the way to Germany, as well as the sources of the Euphrates, which open the road to the Indies, dictating her own terms to the commerce of Greece, France, Italy, Spain, and Egypt : this is what the proud city of Constantine could be, and this is what she is not, "because," as Montesquieu says, "God permitted that Turks should exist on earth, a people the most fit to possess uselessly a great empire."

There exists in the New World a state as admirably situated as Constantinople, and we must say, up to the present time, as uselessly occupied ; we allude to the state of Nicaragua. (See the Map, No. III.)

As Constantinople is the centre of the ancient world, so is the town of Leon, or rather Massaya, the centre of the new ; and if the tongue of land which separates its two lakes from the Pacific Ocean were cut through, she would command, by her central position, the entire coast of North and South America. Like Constantinople, Massaya is situated between two extensive natural harbours, capable of giving shelter to the largest fleets, safe from attack. The state of Nicaragua can become, better than Constantinople, the necessary route for the great commerce of the world, for it is, for the United States, the shortest road to China and the East Indies, and for England and the rest of Europe, to New Holland, Polynesia, and the whole of the western coast of America. The state of Nicaragua is then destined to attain to an extraordinary degree of prosperity and grandeur, for, that which renders its political position more advantageous than that of Constantinople is, that the great maritime powers of Europe would witness with pleasure, and not with jealousy, its attainment of a station no less favourable to its individual interests than to the commerce of the world.

France, England, Holland, Russia, and the United States, have a great commercial interest in the establishment of a communication between the two oceans ; but England has, more than the other powers, a political interest in the execution of this project. England will see with pleasure Central America become a flourishing and powerful state, which will establish a balance of power, by creating in Spanish America a new centre of active enterprise, powerful enough to give rise to a great feeling of nationality, and to prevent, by backing

Mexico, any further encroachment from the north. England will witness with satisfaction the opening of a route which will enable her to communicate more speedily with Oregon, China, and her possessions in New Holland ; she will find, in a word, that the advancement of Central America will renovate the declining commerce of Jamaica and the other English islands in the Antilles, the progressive decay of which will be thereby stopped. It is a happy coincidence that the political and commercial prosperity of the state of Nicaragua is closely connected with the policy of that nation which has the greatest preponderance on the sea.

To show the unparalleled importance which the state of Nicaragua would acquire, if the junction of the two seas were carried through its territory, is at once to resolve the question of its necessity ; but that which we are now called to examine is, whether that particular track would, in preference to that through Panama, more fully meet all the exigencies conducive to the advantages, which both Europe and America have a right to expect from so important an enterprise.

The proposed Canal must not be a mere cutting calculated to convey from one sea to the other European produce simply ; it must, above all, render Central America a maritime state, prosperous by the interchange of its internal produce, and powerful by its extensive commerce. To this intent, such a line of country should be adopted, as would afford, throughout its course, and especially at the extremities, the best harbours, and a confluence with the greatest number of rivers.

If a Canal could be made to cross this Territory of Central America, commencing at San Juan of Nicaragua, situated on the Caribbean sea, and ending at Realejo on the Pacific, that Canal would completely satisfy the required conditions, for Realejo is a good

harbour, and San Juan offers a good roadstead, sheltered from the north-easterly winds, which are the only violent ones upon the coast. Neither at Panama, on the other hand, nor at Chagres, nor on any point of the same coast, is there any moorage to be compared with that just mentioned.

It is not sufficient that this Canal should have at its extremities two good ports,—it must possess, in addition, along its course, a succession of natural basins, serving as docks, which would enable a large number of ships to load and discharge cargo with promptitude and safety.

At London, at Liverpool, at Venice, at Cherbourg, at Havre, at Antwerp, the various governments of Europe, during the last five centuries, have spent hundreds of millions in creating artificial reservoirs, of only a few hundred yards of superficial content, whilst, at Leon and Grenada there are two natural basins, which furnish, on a large scale, without outlay or labour, what we have acquired in Europe on a small scale with extraordinary difficulty, and at enormous expense. We should look in vain to Panama, or any other of the spots we have previously named, for a course equally advantageous in every respect.

In order that the Canal should become the principal element of the advancement of Central America, it must be cut through, not the narrowest part of the tongue of land, but through that country which is the most populous, the most healthy, and the most fertile, and which is crossed by the greatest number of rivers, in order that its activity may be communicated to the remotest parts of the interior. Now, a Canal having its course from San Juan to Realejo, would avail itself of the river San Juan, which receives a great many small streams, and particularly three navigable for boats to a considerable distance inland. From the

embouchure of the river to the Pacific Ocean, the Canal would run in a straight line about two hundred and seventy-eight miles, enhancing the prosperity on either bank of more than one thousand miles of territory, taking into consideration the sinuosities of the lakes and the course of internal rivers. Let us consider the almost miraculous effects that would be produced by the annual passage through this fine country of two or three thousand ships, exchanging foreign productions with those of Central America, and spreading everywhere activity and wealth. We can picture to ourselves those now solitary banks bordered with towns and villages—those now gloomy and silent lakes teeming with lively fleets—those hitherto uncultivated lands made fertile, their forests and mines explored, and the rivers which flow into the lakes and the San Juan, carrying into the heart of the land all the advantages of civilization.

At Panama, on the contrary, such a Canal could only cross a country marshy, unwholesome, uninhabited, and uninhabitable, which would offer a passage of but thirty miles, amidst stagnant waters and barren rocks, yielding no spot of ground fitted for the growth of a trading community, for sheltering fleets, or for the developement and interchange of the produce of the soil.

Thus, in every point of view, a Canal through the lakes would present advantages not to be met with in any other place; but, what is most important to observe, is, that Providence seems to have pointed out this particular tract of country, as presenting the least formidable difficulty of execution.

In fact, according to the surveys made by Mr. Gallia by order of the French Government, a Canal through the isthmus of Panama presents insuperable difficulties. The length of the suggested Canal through Panama would be, it is true, only about thirty miles,

and the utmost height to be attained only one hundred and seventy-seven feet*, but the great difficulty to be overcome in the completion of canals in general, lies in the supply of water to the superior level. Now, as it appears that at Panama, this is the great obstacle, the bold engineer proposes to make a monster tunnel, the cost of which would be two millions of pounds sterling, and which would present to the passage of large ships, the most serious inconveniences.

We are about to show that through the lakes, a Canal, although much longer, would be less costly. We will for this purpose, describe the country in view.

CHAPTER II.

DESCRIPTION OF THE PLACES THROUGH WHICH THE CANAL OF NICARAGUA IS TO PASS,—LENGTH OF ITS COURSE.

(*See the Map No. III.*)

The proposed Canal between the Atlantic and the Pacific oceans, commencing at the Port of San Juan, and terminating at the Port of Realejo, would traverse,—1st., the River San Juan, which, according to Mr. Bailly is, with its windings, ninety English miles, and one hundred and four miles according to the narrative journal of Mr. G. Lawrance, mate and assistant-surveyor of her Majesty's surveying vessel *Thunder*, in March, 1840 ;

* “Projet d'un Canal de jonction à travers L'Isthme de Panama, par M. Garella, pp. 79 to 89.”—Paris, 1845.

2nd, the Lake of Nicaragua, which is ninety geographical miles long ; 3rd, the river of Tipitapa, joining the lake of Nicaragua to that of Leon, a course of twenty miles ; 4th, the lake of Leon or Managua, which is thirty-five miles ; 5th, the isthmus between the Lake of Leon and the port of Realejo, twenty-nine miles.

Recapitulation.

Length of the river San Juan	104 miles
„ „ lake of Nicaragua	90 „
„ „ river Tipitapa	20 „
„ „ lake Leon	35 „
„ „ isthmus between the lake Leon and the Pacific ocean	29 „
Total length of the communication between the two seas	278 „

But we must hasten to say, that in all this length, there are only eighty-two miles, which are to be worked.

Height above the level of the Ocean.

According to the surveys made by Mr. Baily, an English engineer, in 1837-38, the lake of Nicaragua is one hundred and twenty-eight feet three inches above the level of the Pacific ocean, at low water and full moon.

The lake of Leon is twenty-eight feet eight inches above the level of that of Nicaragua.

Finally, the most elevated point of land between the lake Leon and Realejo is fifty-five feet six inches above the level of the lake. Total height of the superior level, two hundred and twelve feet five inches.

The difference of level between high-water in the Pacific and low-water in the Atlantic being, according to Mr. Garella, nineteen feet and a half, it will be necessary to add this difference, in order to know how

much the superior level of the Canal will be above that of the Atlantic ocean. This variation of level between the two oceans has been considered, by some persons little conversant with hydraulic works, as an obstacle to the construction of the Canal; but this objection has no foundation, the difference being a mere question of locks, and nothing more. In the actual case, the lakes must be considered as two large reservoirs, situated above the level of the two seas, and made, by artificial means, to discharge their waters into them. If, therefore, the level of one of the seas is above that of the other, it is evident that the fall into the highest will be less rapid, and will require a less number of locks than on the opposite side.

Recapitulation.

	<i>Above the Atlantic.</i>			<i>Above the Pacific.</i>	
	FT.	IN.		FT.	IN.
Height of the lake of Nicaragua ..	147	9	..	128	3
“ “ Leon	176	5	..	156	11
Height of the superior Level.....	231	11	..	212	5

Let us now give all the information we possess, respecting the places through which the Canal is to pass, in order to show what are the works necessary to the success of the undertaking.

§ 1.—*The River San Juan.*

“The river San Juan,” says Mr. Baily, “flows from the lake
 “of Nicaragua at its south-eastern extremity, at the place where
 “formerly stood the fort of St. Charles, now completely des-
 “troyed. Here is the only discharge for the waters of both the
 “lakes. The whole length of the river, pursuing all its wind-
 “ings from St. Charles down to the port of San Juan del
 “Norte, is ninety miles (others say one hundred and four
 “miles); it forms a magnificent stream, somewhat irregular
 “in its breadth, which varies from one hundred to two hundred
 “yards, studded with small islands, forming for the most part a
 “channel on each side of them. The depth of the water varies
 “from one and a half to seven, eight, and nine fathoms. In

“ the mid-stream the depth is generally from three to five fathoms, but during the rainy season, namely from May to November, the depth is considerably increased ; for, according to observations made at the ruined fort near Grenada, in calm weather, in October, 1838, when the rainy season had just terminated, and again in May, 1839, before the rains had commenced, when the lake was at the lowest, the difference of height between these extremes was found to be six feet six inches. In November, 1839, at which time the rains had ceased, the same observations were made, and the result was that the waters had risen fourteen inches less than in the previous year.

“ The banks of the river, particularly the right, are fringed with wood of all sizes and descriptions, with a dense undergrowth, forming, altogether, a forest nearly impenetrable ; consequently there are no inhabitants, nor is the land cultivated, although of prodigious fertility. The immediate shores are undulating, being in some parts not more than a few feet, and in others between twenty and thirty feet above the surface of the water.

“ Two large rivers, the San Carlos and Sarapiqui, besides many small streams, discharge into the San Juan.”

According to Mr. A. G * * *, there are also very large rivers, which have their source in the mountains bordering the country of the Mosquitos, and which discharge by the left bank into the San Juan.

“ From the gentle declivity of the river San Juan, the current is not strong, being at the rate of a mile or a mile and a half per hour, except in the times of freshes, when it is accelerated variously, according to circumstances. It is navigated all the year round by boats of eight or ten tons burthen, called *Bongos*, and which are generally manned by ten or twelve men, besides the patron. They can carry about one hundred *seroons* of indigo, or five hundred hides, or a proportionate quantity of Brazilian timber. The obstacles which now prevent the advantageous navigation of the river San Juan are,—first, the rapids ; secondly, the drainage occasioned by its efflux into another river, called the Colorado, seventeen miles above the port of San Juan ; and lastly, the

“labyrinths of small islands, which extend ten or twelve miles from the opening of the river Colorado to the mouth of the river San Juan. It is generally believed that at some former epoch, the Spaniards purposely enlarged the opening of this branch with the intent of exhausting the main river, at that part, to such an extent as to render the river impracticable to navigation, hoping thereby to protect the town of Grenada from external attacks. In the present advanced stage of the science of civil engineering, this obstacle would be easily surmounted. The rapids are four in number; called *del Toro*, *del Castillo Viejo*, *de las Balas*, and *de Machuca*, all comprised within an extent of ten miles, but there is clear water-way from one to the other, having good depth of from three to six fathoms; the longest of these rapids is not more than one mile. The rocks by which they are occasioned are all placed transversely to the current, leaving a narrow channel on each side, and showing their ragged and sharpened edges above the surface of the water during the dry season.

“The breadth of the river from this point is between one hundred and one hundred and twenty yards; the current rushes with violence, and dashes with great force against and between the projecting points. The *Bongos*, however, make the passage without hazard, and we have never heard of the occurrence of an accident.

“The Colorado diverges from the San Juan in $10^{\circ} 50'$ north latitude, and after running in a south-westerly direction, falls into the sea in $10^{\circ} 46'$, forming a dangerous bar. This river abstracts from the main stream a considerable quantity of water, the opening from the San Juan being twelve hundred feet wide, and having in the deepest part nine feet of water at the lowest state of the river. From measurements of this section, carefully taken at two different periods, in May when at the minimum, and in July when much increased by freshes, it appears from calculation, that at the first period the loss of water from the river was 28178 cubic yards per minute, and at the latter observation, as much as 85840 cubic yards. The main current being thus suddenly weakened, the motion of the water becomes sluggish, and the natural effect is, that deposits of sand and mud are formed, which gradually augment where the movement of the water is feeble; trunks of trees and other floating bodies grounding on these, small islets are

“ formed by successive aggregations, which soon become covered
 “ with rank grass, reeds, and other herbaceous plants of rapid
 “ growth ; a great number of these mounds have been thus
 “ raised, and the progress of formation is continually going on.
 “ The usual methods of clearing the beds of rivers could here
 “ be applied with facility and good effect, as the accumulations
 “ are nothing more than silt and sand with occasional logs
 “ buried underneath. A dam across the Colorado branch, con-
 “ structed on such of the well-known plans as might be judged
 “ the most efficient, would be indispensable. Then the reforced
 “ body of water, aided, if necessary, by the resources of art,
 “ would, by the momentum of its increased velocity, soon clear
 “ a channel to the depth that should be deemed requisite : other
 “ parts of the river where such operations might be wanted,
 “ could be improved by nearly similar methods, as the bottom
 “ is everywhere composed of mud and sand, except about the
 “ rapids, where it is of rock or loose stones.

From the preceding account, as well as from the survey made in 1840 by Mr. George Lawrance, mate and assistant-surveyor of her Majesty's vessel *Thunder*, and from the information which we have received from Captain A. G., who travelled through the country in 1842, we may infer the following particulars : —

The river San Juan may be divided into four parts. The first begins at the lake, and extends twenty-seven miles, as far as the first rapid ; the second comprises the whole space occupied by the rapids, that is to say, fifteen miles ; the third extends from the rapids to the bifurcation created by the Colorado (forty-three miles) ; and the fourth extends from the outspring of the Colorado down to the sea (nineteen miles).

The first part, from the lake down to the river Savalos, where the rapid *del Toro* begins, affords an easy navigation, the current being very moderate, and the river, at its efflux from the lake, being from six to seven feet deep in the dry season ; but its depth increases, as it advances, from nine to twenty feet. The breadth of the river is no

more than one-fourth of a mile. These first twenty-seven miles require very little labour, for in all this distance only one-third of the bed of the river, that is to say, nine miles, requires to be dredged by steam power.

In the second part, which comprises the rapids, the following works would be required :—

The banks of the rapid *del Toro* rising gradually, a lock placed at its termination would give the required depth, as there is a channel from nine to ten feet deep. Its length is one mile, and it runs only four miles per hour. For a distance of four miles there is still water, with a depth of from twelve to twenty-four feet; the banks are low, with a single exception on the northern side, where they rise eight feet above the level of the water. They do not attain a greater elevation until we reach the rapids of Mico and Balas. At Castillo Viejo we meet with other rapids, extending one thousand and ninety yards, and being from twelve to twenty-four feet in depth. Here some dredging would be necessary.

After two miles and a quarter of navigable stream, with thirteen feet of water, we approach the rapids of *Mico* and *de las Balas*, being together one mile and one-eighth in length. These two rapids are almost contiguous, and therefore considered as one. The depth of the channel varies between six and eighteen feet; the banks are six to eight, up to twenty feet above the level the water. At this spot a lock would be necessary. Between this rapid and that of Machuca, is an extent of three miles of still water of considerable depth, where there would be scarcely any labour.

The last rapid is that of *Machuca*; it occupies more than a mile in length, and is considered the most dangerous of all, though its current is less rapid than that of the two last mentioned. Its velocity does not at any point exceed five miles per hour when the water is low. In the dry season it appears only as an extensive shallow,

over which a great number of rocks are dispersed, which are most superficially covered with water. In this place also, the banks are high enough to allow the raising of the waters by means of a lock.

The third part of the San Juan, into which two large rivers, the San Carlos and the Serapiqui, flow, is deeply imbedded, so that four or five locks, and less than ten miles of dredging, would suffice to render that portion of the river navigable.

As to the fourth part of the San Juan, extending from the Colorado to the sea, there are nine miles of good navigation, but the remainder, owing to its being shoaly, would require deepening, and the bulk of the water being augmented, by stopping its efflux into the Colorado. Still, if it were found indispensable to make an adjacent canal, its length would be only ten miles.

In recapitulating the works to be made in the river, we find—

	Yards.
For the first part—to be deepened 9 miles, or	15,840
For the second part—at the first rapid	1,760
“ “ at the second rapid	1,090
“ “ at the third rapid	2,000
“ “ at the fourth rapid	2,016
For the third part—works	17,600
For the fourth part—works	17,600
Total	57,906
	or 33 miles.

The length of the locks to be constructed at each of the four rapids, will be from two hundred and sixty-two feet to three hundred and fifty-seven feet.

The investigations of Mr. A. G * * *, made in 1833, confirm, in every particular, what we have above stated ; and we arrive at this conclusion : *firstly*,—that throughout the whole of its course, within ten miles of its *embouchure*, the river San Juan, in its ordinary state, has a minimum depth of six feet. *Secondly*,—that, with

trifling exceptions, its banks are high enough to enable us, with the assistance of dykes and locks, to increase the bulk of water to the requisite depth. *Thirdly*,—that at some parts, as well as at the mouth, the bed of the river is calculated to receive the necessary operations of dredging by steam-power.

Thus, by enclosing each of the four rapids between two locks, and placing one or two at the mouth of the river, we may have, on the San Juan, nine or ten locks, which, in an ordinary canal, would be sufficient only for a fall of eighty-eight feet ; but, as in this case the natural fall of the river would not be altered, the locks would merely serve to augment its depth, and not to restrain the natural flow of the water.

§ 2.—*Harbour of San Juan Del Norte.*

The port of San Juan de Nicaragua, or Del Norte, according to the accounts given by Messrs. Baily, Rouhaud, Dumartray, and several other French officers, is extremely large and safe.

By inspecting the Plan drawn on the Chart No. III., in 1832, by Mr. G. Peacock, of H.M.S. *Hyacinth*, it will be found that the bar is capable of admitting large ships, and that the roadstead affords a good shelter from the northerly winds, which prevail with great violence in those roads.

§ 3.—*The Lake of Nicaragua or Grenada.*

Mr. Baily furnishes us in his pamphlet with the following particulars :—

“ The lake of Grenada is ninety geographical miles long,
 “ its greatest breadth is forty, and the mean twenty miles ;
 “ the depth of water is variable, being in some places close
 “ to the shore, and in others half a mile from it, two fathoms,
 “ increasing gradually to eight, ten, twelve, and fifteen fathoms,
 “ the bottom usually mud. [Mr. A. G * * * sounded in the
 “ middle of the lake forty-five fathoms.] This basin is the re-

“ ceptacle of the waters from a tract of country six to ten leagues
 “ in breadth on each side of it, thrown in by numerous streams
 “ and rivers, none of them navigable except the river Frio, having
 “ its source far away in the mountains of Costarica, which dis-
 “ charges into the lake a large quantity of water near the spot
 “ where the river San Juan flows out of it. The embouchure is
 “ two hundred yards wide, and nearly two fathoms deep. There
 “ are several islands and groups of islets in different parts of the
 “ lake, but none of them embarrass the navigation, nor is this
 “ anywhere incommoded by shoals or banks, other than the shal-
 “ low water in shore ; and even this is but very trifling, or rather
 “ it is no impediment at all to the craft at present in use, the
 “ practice being to keep the shore close aboard for the purpose
 “ of choosing convenient stopping places at the close of day, as
 “ they scarcely ever continue their voyage during the night.

“ The district extending to the eastern coast is called Chon-
 “ tales. Its soil, although covered with trees, presents in dif-
 “ ferent places excellent pasturage, divided into farms, on which
 “ the breeding of cattle is chiefly pursued.

“ The largest islands on the lake are Omotepe, Madera, and
 “ Zapatera. Taken together, the first two of these islands are
 “ twelve miles long. Zapatera is almost triangular, and five
 “ miles long. Sanate, Salentinane, and Zapote, are smaller,
 “ and uninhabited, but some of them, and the last in particular,
 “ are capable of cultivation.”

“ Near the town of Grenada there is the best anchorage for
 “ ships of the largest dimensions.”

§ 4.—*The River Tipitapa.*

“ The lake of Nicaragua,” says Mr. Baily, “ is connected
 “ with that of Leon by means of the river Panaloya (or Tipitapa),
 “ navigable for the boats employed in that country for twelve
 “ miles, as far as the place called Pasquiel, where the inhabit-
 “ ants go to cut and bring away Brazilian timber. The four
 “ miles which remain between that place and the lake of Leon,
 “ are not navigable by any kind of boat, whatever may be its
 “ construction, because, beyond Pasquiel, the channel is ob-
 “ structed by a vein of rocks, which, when the river is swollen,
 “ are covered with water ; but in the dry season, the water sinks
 “ so low that it can only escape through gradually diminishing

“ fissures in the rocks. At a distance of a mile beyond this
 “ first vein of rocks, we find another more solid, which, crossing
 “ the river at right angles, forms a cascade of thirteen feet descent.

“ The river Tipitapa*, which discharges itself into the lake
 “ of Nicaragua, is the only outlet for the lake Leon. The lands
 “ bordering this river are somewhat low, but fertile, having
 “ excellent pasturage ; as at Chontales, they are divided into
 “ grazing and breeding farms. All this country, covered with
 “ Brazilian timber, is scantily inhabited. The only village is
 “ that of Tipitapa, situated near the above-mentioned water-
 “ fall. It contains a small church, and about one hundred cot-
 “ tages. The river is crossed by a wooden bridge.”

In order to render this river fit for navigation, it would be necessary to construct three locks and canalise it throughout ; but Mr. A. G. * * * is of opinion, that for the first twelve miles, it would only be necessary to have a lock to increase the depth of the river. Mr. Lawrance says, that the navigable part of the river has a depth of from three to eighteen feet, and that the fall at Pasquiel is thirteen feet high. He estimates the length of the river at twenty miles.

§ 5.—*The Lake of Leon or Managua.*

The lake of Leon is from thirty-two to thirty-five miles long, and sixteen miles at its greatest width. It receives from the circumjacent lands, and principally from the eastern coast, a number of streams, none of which may be considered large. According to Mr. Lawrance, it is not so deep as that of Nicaragua ; but according to Mr. A. G. * * *, it is still deeper.

* “ According to Mr. Stephens,” says M. Michel Chevalier, “ the
 “ whole fall of the river Tipitapa, which amounts to twenty-eight feet,
 “ is comprised within the first six miles from the lake Leon. Mr.
 “ Rouhaud, who has assisted in the topographical discoveries in that
 “ country, has told me that the fall of twenty-eight feet was distribu-
 “ ted as follows, viz. : eighteen feet are precipitated by a cascade at
 “ Tipitapa, and the remaining ten feet and a half descend from Tipi-
 “ tapa to Nicaragua.”

Its banks are higher and more perpendicular than those of Nicaragua, which would allow of the level being raised, if requisite, by the formation of a dam, just above the point where it discharges its waters by the river Tipitapa.

§ 6.—*The Isthmus between the lake Leon and Realejo.*

M. Michel Chevalier says, that the account of the celebrated navigator Dampier, who had been at war in those regions, induced a belief that throughout the different routes from the lake Leon to Realejo and from the lake of Nicaragua to the gulph of Papagayo or to that of Nicaya, the land consists for the most part of level plains, and that between the lake of Leon and the coast of Realejo, the soil is quite flat. Mr. Stephens in giving an account of his personal impressions, also says, that it is a perfect level. Mr. Rouhaud likewise has spoken in the same terms of the country included between the north-western part of the lake of Leon, and the port of Realejo, and of the tract of land which extends between the same point and the port of Tamarindo. He thinks nineteen feet or twenty-two feet to be the height of the bank above the level of the water. Then comes, says he, a small zone on a very slight and yet sensible declivity, by which we gently descend to the Pacific ocean. This unanimity of opinions is rather encouraging.

Mr. Michel Chevalier then adds (page 96), "I see, however, "in the description of Central America and Mexico, published "in Boston in 1833,* that the highest land between the lake "of Leon and the Pacific ocean descends to be only fifty- "one feet above the level of the lake. From the same lake "to the river Tosta is but eleven miles; and that river not "more than three feet above the level of the lake, at the point "where a junction might be effected. If fully established, "this statement would be of great importance, for we can

* "Mexico and Guatemala," vol. II., p. 285.

“ avoid any extraordinary cutting, and *a fortiori* a tunnel. A cutting of seventy-two feet maximum* is nothing unusual in the operations of the engineers of the *ponts* and *chaussées*.

“ By employing improved machinery and implements, which are now at the disposal of the engineer, we can execute deep cuttings at little expense, in the absence of rocky grounds. In the canal from Arles to Bouc, for instance, the table-land of the Lègue has been cut through to the extent of 2289 yards, the extreme depth being from forty-three to fifty-four yards. The expense has been less than 160,000*l.*, notwithstanding its having been executed on the old system.† Now-a-days, works of this nature are executed with powerful engines; manual labour is confined to mere digging and loading; and upon the great northern railroad of France, a machine has been successfully and economically employed, even for this last purpose.”

We have now arrived at an important feature of our work. Up to the present time, the general opinion of competent persons who have devoted their attention to the junction of the two seas through the state of Nicaragua, is, that the canalisation of the rivers San Juan and Tipitapa offers no extraordinary difficulty. The only important point to ascertain, was the elevation of the land between the lake of Leon and the Pacific. We have seen that the engineers agree in representing this elevation as not being considerable. Dampier, Stephens, Rouhaud, Bailly, contend that the country gradually declines to the ocean. According to other informants, the highest ground is forty-nine and a-half feet above the lake of Leon; but Mr. A. G * * *, who explored the country in 1842, has accurately investigated its formation, and has furnished us with the following particulars.

The western coast of the lake of Leon is twenty-six

* Adding nineteen and a-half feet for the depth of the Canal below the water-line, which would then be on a level with the lake.

† This cutting, accomplished through a rocky and argillaceous soil, has cost 140,000*l.* The canal is only twenty-three feet wide.

feet above the level of the lake. From hence the land rises gradually for a distance of 2725 yards to an elevation of fifty-five feet six inches; here is then the culminating point, whence the ground gently descends to the ocean.

At a distance of eleven miles from the western shore of the lake, on the line which the canal should take to join Realejo, we find the river Tosta, which, at this spot, is thirty-four feet above the lake, and of course its source, issuing at the foot of the volcano Telica, must be much more elevated. This river would supply the Canal with abundance of water, being, on an average, sixty-five feet wide, and six feet deep at low-water. The rapidity of its current, which appears to be considerable, has not been estimated. Supposing it to be twenty inches per second, we find that the bulk of water supplied is thirteen cubic yards per second, a quantity more than sufficient, since Mr. Garella, in page 107 of his work, has calculated, that the waste of water occasioned by the opening of locks and evaporation, would not exceed 258,000 cubic yards per twenty-four hours, corresponding with a loss of three cubic yards per second.

These facts enable us to dispense with more elaborate investigations, whilst they sufficiently prove the practicability of the proposed cutting near Realejo.

We must not omit to quote here the words of Captain Sir Edward Belcher, R.N., who explored this country in 1838 :—

“ At the term—day,” says he, “ we pitched our observatory
“ near the sea-margin, at the base of the volcano of Consequina,
“ or Quisiguina, and having completed the requisite observations,
“ started with the *Starling* and boats to explore the Estero Real,
“ which I had been given to understand was navigable for *sixty*
“ *miles*; in which case, from what I had seen of its course on
“ my visit to the Viejo, it must nearly communicate with the
“ lake of Managua.

“ After considerable labour, we succeeded in carrying the

“ *Starling* thirty miles from its mouth, and could easily have gone further, had the wind permitted, but the prevailing strong winds rendered the toil of towing too heavy.

“ We ascended a small hill about a mile below our extreme position, from which angles were taken to all the commanding peaks. From that survey, added to what I remarked from the summit of the Viejo, I am satisfied that the stream could have been followed many miles higher; and I have not the slightest doubt that it is fed very near to the lake of Managua. I saw the mountains beyond the lake on its eastern side, and no land higher than the intervening trees occurred. This, therefore, would be the most advantageous line for a canal, which, by *entire lake navigation*, might be connected with the interior of the states of San Salvador, Honduras, Nicaragua, and extended to the Atlantic. Thirty navigable miles for vessels drawing ten feet, we can vouch for, and the natives and residents assert sixty more. But steamers will be absolutely necessary to tow against the prevalent breezes.”—[‘*Voyage Round the World*,’ Vol. I., pp. 236. London: Colburn, 1843.]

He adds in the appendix, (Vol. II., p. 307,) that—

“ In the port of Realejo there is a river, the Donna Paula, which takes a course towards Leon, and is navigable within three leagues of that city. It has been suggested to carry a railroad from Leon to the lake of Managua. As to any canal into the Pacific, unless behind Momotombo, Telica and Viejo range, into the Estero-Real, I see little feasibility in the scheme.”

It is, then, quite evident that the information of Sir Edward Belcher, although directed towards a different line, confirms the feasibility and facility of constructing a canal through the isthmus of Realejo.

We have already alluded to the salubrity of the climate, through the tract of country we have adopted, as well as to the low rate of wages. We deem it useful to quote on this subject Mr. Baily’s own observations :

“ In executing so stupendous an undertaking,” says he, “ salubrity of climate, and the means of feeding abundantly and

“ economically so large a body of workmen as would be col-
 “ lected, are subjects that cannot be passed over without notice.
 “ With regard to the first, the writer can aver that during four
 “ months that he was occupied between the Pacific and the lake
 “ of Grenada, with a party of forty individuals, there was not a
 “ man prevented by sickness from performing his daily labour,
 “ although continually sleeping at night in the open air. On
 “ the lake and in the river San Juan, with a large party, the
 “ men maintained their health well, although exposed to fre-
 “ quent rains in the latter. But when at the port (del Norte),
 “ or near to it, sickness got among them, which was mainly
 “ attributable to the use or rather abuse of ardent spirits, and
 “ other excesses, so frequently indulged in at such places. This
 “ change, however, is not assignable solely to indulgence in
 “ excesses, because San Juan is exposed to all the dangerous
 “ influences of climate and temperature peculiar to the Mosquito
 “ shore, and all the coast from cape Gracias a Dios to Cartha-
 “ gena and beyond it.

“ The population of the state of Nicaragua may be said not
 “ to extend, south only, much beyond the environs of the town
 “ of Nicaragua, so that the line of survey approaching it in no
 “ part nearer than four leagues, passed over a comparative
 “ wilderness, and consequently all provisions were supplied from
 “ that place; these are always to be had in abundance, and,
 “ should circumstances require it, they could be drawn from
 “ other parts of the state to almost any extent. The principal
 “ articles of consumption are meat (beef), maise, frixoles, rice,
 “ plantains, and fruits, which can be furnished at moderate
 “ prices; as for example—meat at $3\frac{1}{2}$, 4, or $4\frac{1}{2}$ reals the arroba
 “ of 25 lbs., (the *real* is equal to sixpence of English money);
 “ maise, varying according to seasons, 6, 8, or 10, seldom 12
 “ reals per fanega, which weighs about 260 lbs.; frixoles and
 “ rice in similar proportions; plantains, which are universally
 “ used, especially by the labouring classes, are so plentiful that
 “ a mule-load of them (which is from two to three quintals), can
 “ be had throughout the year for 2 or $2\frac{1}{2}$ reals; so that if a
 “ large number of workmen were to be collected in this direc-
 “ tion, there would be found no difficulty in supplying them
 “ with all the ordinary necessities of life.

“ The price paid for labour during the survey was $7\frac{1}{2}$ dollars
 “ per man per month, besides provisions, which on an average

“ amounted to half a real a day ; but this was higher than what
 “ is usually given for general field-work, in consideration of the
 “ men being taken to a distance from their families for an
 “ indefinite time. For work such as that in question, good
 “ native artisans would be scarce, but there would be no want
 “ of labouring hands, for the certainty and regularity of their
 “ pay would attract men, not only from all parts of this, but
 “ from the adjoining states of Costa-Rica, Honduras, and Sal-
 “ vador also, while a judicious system of equitable regulations
 “ would insure their docility and submissiveness. The bar-
 “ barism that has been attributed to this population in the
 “ writings before alluded to, needs no other refutation than
 “ saying that the imputation is unfounded ; nor is it, nor can it
 “ be a supposable fact that the peasantry of the one country
 “ should differ very much from that of the other adjoining to
 “ it, the same language, habits, and customs being common to
 “ both.”

§ 7.—*The Harbour of Realejo, on the Pacific.*

Captain Sir Edward Belcher made in 1838 the survey of this harbour, which we give on the Map, No. III. The same author gives the following particulars :—

“ Cardon, at the mouth of the port of Realejo, is situated in
 “ 12° 28' north, and about 87° 12' west. It has two entrances,
 “ both of which are safe, under proper precaution, in all weather.
 “ The depth varies from two to seven fathoms, and good and
 “ safe anchorage extends for several miles ; the rise and fall of
 “ tide is eleven feet, full and change 3 hours 6 minutes. Docks
 “ or slips therefore may easily be constructed, and timber is
 “ readily to be procured of any dimensions ; wood, water, and
 “ immediate necessities and luxuries are plentiful and cheap.
 “ The village of Realejo is about nine miles from the sea, and
 “ its population is about one thousand souls. The principal
 “ occupation of the working males is on the water, loading and
 “ unloading vessels. It has a custom-house and officers under
 “ a collector, comptroller, and captain of the port.”—[‘ Voyage
 round the World,’ Vol. II., p. 307.]

So, according to what we have already stated, it is quite evident that the Canal through the state of Nica-

ragua would have all the required advantages. It would cross the most fertile, the most healthy and populous parts of Central America, and consequently be the more easily accessible to a high state of prosperity and grandeur. It would open into the finest lakes of the world, communicate with extensive rivers, and, by possessing at its extremities two large sea-ports, it would spread the advantages of civilization over a considerable tract of country.

CHAPTER III.

DIMENSIONS OF THE CANAL.

Before we enter upon the calculation of the probable cost of the Canal, we are about to establish the dimensions it should have, by adopting the numbers laid down by Mr. Garella, in his work on Panama, although the width of one hundred and forty-seven feet, given to it by him, is rather greater than necessary.

The Caledonian, the largest of all existing canals, is only one hundred and twenty-one feet wide at the water-line, but in order to render the towing by steam easier, we adopt the greater width.

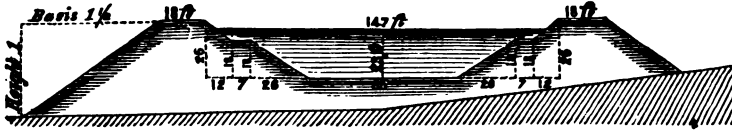
Mr. Garella has calculated the dimensions of the Canal, in such a manner, as to admit merchantmen of 1200 tons burthen. Now a ship of this magnitude, may be compared with a second-rate frigate of war, which has the following dimensions:—

Dimensions of a Ship of 1200 tons.

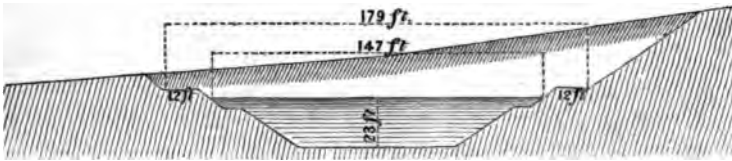
Extreme length at the cut-water.....	198 feet.
Length of the main-deck	175½ „
Width at the main-chains.....	45 „
Maximum draught of water, with cargo	21½ „

Dimensions of the Vertical Section of the Canal.

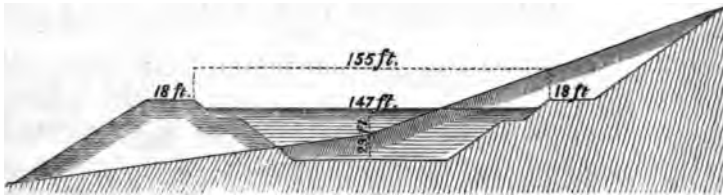
MADE IN A SIDE CUTTING.



MADE ON AN EMBANKMENT.



PART IN A CUTTING—PART IN AN EMBANKMENT.



A depth, exceeding by 19 inches, the maximum draught of water required by the largest ship.	23 feet.
Width of the Canal at water-line (three widths of the largest ship)	147 „
Width at the bottom.	65 feet.
Width at the level of the towing path 3 feet above the water-line	155 „

The inclination of the bank is in the proportion of $1\frac{1}{2}$ basis to 1 height, and offers, at the depth of 5 feet, an embankment of 7 feet, to prevent the falling in of the earth.

The towing-path, formed on both sides of the Canal, would be 18 feet wide.

In the rocky parts, the embankments would have a declivity of one-tenth only, and the width would be

At the water-line	131 feet.
At the bottom	126 “
At the level of the towing-path	131 “
Inclusive of the paths	158 “

Dimensions of the Locks.

The locks, to admit ships of 1200 tons, would have the following dimensions :—

Width	47 feet.
Length within the gates	210 “

These dimensions would be sufficient to admit at the same time into one lock,—

Two merchantmen of three hundred tons each ; these ships being one hundred and fourteen feet ten inches at their greatest length at the cutwater, and thirty feet wide at the main-chains.

Or, two brigs of sixteen guns, the length of such being one hundred and eleven feet six inches, and the width twenty-nine feet four inches.

Or, two lighters of three hundred and eighty tons each, being one hundred and seventeen feet nine inches at their greatest length.

The aforesaid dimensions are one-fifth greater than those of the Caledonian canal, calculated to admit frigates of the third rank.

CHAPTER IV.

ESTIMATE OF THE EXPENSE OF CONSTRUCTING THE CANAL.

According to what we have already stated, there are three distinct places where works are to be undertaken :

Firstly,—On the river San Juan ;

Secondly,—On the river Tipitapa ;

Thirdly,—At the Isthmus between the lake Leon, and the Pacific ocean.

We will also follow the estimates laid down by Mr. Garella, for analogous works projected at Panama, but we must remark that the prices mentioned by this engineer are exceedingly high : for instance, he calculates at three francs (about two shillings and sixpence) a day, the wages of a labourer ; whilst we know, that at Grenada and Leon they are as low as sixpence.

According to our former statement, the works required on the San Juan, are as follows :

Works on the River San Juan.

At the river San Juan : ten <i>barrages</i> locks at £24,000.....	£ 240,000
51,040 yards of the bed of the river to be deepened and cleared (reckoning 90 cubic yards per running yard) by steam-dredging machine ; we find 4,593,600 cubic yards, at 1s. 6d.....	344,520
6866 yards to be subjected to mining operations at £16 per running yard	109,856
Towing-path, at 16s. per running yard, upon an extent of 183,040 yards.....	146,432
Damming the Colorado	20,000
Total cost of works on the San Juan	£ 860,808

Works on the River Tipitapa.

Although the river Tipitapa, to be made navigable, by mining and dredging, requires these operations only through 7040 yards, still, we think this operation to be necessary throughout its whole course of twenty miles, requiring three locks to compensate the fall, costing as understated, viz. : —

Three locks	£ 72,000
35,200 yards of the river to be deepened, at £8 per running yard	281,600
Towing-path at 16s. per running yard on the extent of 35,200 yards.....	28,160

Total cost of work on Tipitapa £381,760

Works at the Isthmus of Realejo.

As regards the isthmus of Realejo, we believe ourselves to be within the truth in allotting upon the whole extent of 51,040 yards from the lake Leon to the Pacific ocean, a cutting of an average depth of 33 feet, giving for the superficies of the section 484 square yards. We have then 484 square yards × 51,040 yards = 24,703,360 cubic yards, which, at 1s. 2d. £1,441,029

The greatest elevation being 212 feet 5 inches above the level of the Pacific ocean, and 55 feet 6 inches above the level of lake St. Leon, the Western declivity will be compensated by 23 locks, and the Eastern by 6 locks,—in all 29 locks: costing 696,000

The soil being level pasturage, we calculate the expense of the Towing-path at 8s. per yard. On the whole extent of 51,040 yards. 20,416

Total cost of works on the isthmus of Realejo £2,157,445

Works to be executed at the Ports forming the extremities of the Canal.—(Given as a Memorandum.)

Although the engineers are of opinion that both the Port of Realejo and that of San Juan, would require but insignificant works, still, we calculate the probable expense of deepening the Bar, at £ 80,000

General Recapitulation.

Works on the river San Juan	£860,808
Do. do. Tipitapa	381,760
Do. on the isthmus of Realejo	2,157,445
Do. at the extreme ports	80,000
Purchase of tools, engines, waggons, &c.	120,000
Total cost	3,600,013
Casual expenses and reserved fund	399,987
Total	£4,000,000

We wish the reader to observe, that, contrary to the general custom, we have exaggerated the expenses instead of undervaluing them, having supposed a great many extensive works to be requisite, where the reports agree in describing them as perfectly insignificant; besides, we have followed the calculations of Mr. Garella, who, according to his own saying, has adopted in all these works, the rate of European wages, with an increase of fifty per cent. [Pamphlet of Mr. Garella, p. 120.] On the other hand, if we take into consideration the information of Captain Sir Edward Belcher (of whom we have already spoken), respecting the discovery of a river, which he considers to be navigable from the sea up to the lake Leon, and which could easily be made to admit of large ships,—the expenses, in this case, would be reduced at least one million sterling.

CHAPTER V.

PROBABLE REVENUE OF THE CANAL.

SECTION I.

The revenue of the canal may be derived, first, from tolls, to which all ships will be subject; secondly, from the increase of value of the lands to be given by the government of Nicaragua to the Company.

Let us examine what ships will adopt this new route. These will be, not only all those vessels which would otherwise have to double Cape Horn to go to Peru, Chili, Oregon, California, and all other places upon the western coast of America, as well as the islands of Oceania; not only the great number of whalers who go to the South Pacific; but also all those that, from Europe, are bound to China, Manilla, New Holland, and New Zealand; for though, by the canal, the voyage to China will be nearly as long as by the Cape of Good Hope, still the ships will have an advantage in the freedom from maritime dangers, the assistance of the trade winds, and the equatorial currents. On the homeward voyage, these last two advantages would not exist. On the other hand, the plan proposed to Sir Robert Peel by Mr. Edward M'Geachy, of Jamaica (see the 'Kingston Morning Journal' of the 11th of March, 1846), for a communication to be established by steam-packets, proves, that if the isthmus of Panama or Nicaragua were opened, it would accelerate, by these conveyances, the correspondence with Canton, far more than by the Overland Mail through Egypt.

By the opening of the canal, the Island of Japan would perhaps, like China, offer an additional stimulus to the commerce of the world.

From the observations we have published in the appendix No. II., and for which we are indebted to Mr. William Wittich, professor at the London University, it will be seen that the opening of the Canal of Nicaragua would shorten the voyage from Europe to the western coast of America 2846 miles, and save on an average forty-eight days. For by casting up the number of miles and days employed in going and returning between London, Callao, Valparaiso, and Oregon, through the Canal, and by comparing the distance with the number of miles and days employed for the same voyage by Cape Horn, the average time will be found as above stated. To go to Canton, Singapore, and Sydney, we find, it is true (without reckoning the return), an average increase of 932 miles; but, on account of the winds and currents we have a diminution in the time of twenty-six days.

With regard to ships from the United States of America, all these distances would be shortened by 1400 miles and fifteen days (the ships starting from New Orleans would have a still greater advantage); consequently, Europe would gain forty-seven days in a voyage to the western coast of America, whilst the United States would gain sixty-two days; to China and Sydney, Europe would gain twenty-nine days, and the United States, forty-four days. (See the Map, No. I.)

If, then, a way were cut through Central America, it would, first, be made use of by all ships at present compelled to double Cape Horn; secondly, by a considerable part of those which now double the Cape of Good Hope.

We will now observe the number of these ships:—According to the papers ordered to be published by the Minister of Commerce of France, the number of ships belonging to the four great maritime powers, France, England, the Netherlands, and the United States, which passed Cape Horn and the Cape of Good Hope during

the year 1841, was 2966, measuring altogether 1,203,762 tons ; and it is to be observed, that we exclude secondary maritime powers, which we may estimate at least at 200,000 tons.

Now, it must be admitted that, out of these 1,400,000 tons of shipping, 700,000 tons at least have doubled Cape Horn ; for—

	Tons.
In 1835, England and the United States forwarded	205,000
“ France	30,000
“ Holland (48,000), Spain, Denmark, and Sweden	65,000
Total	300,000

Which gives a traffic of 600,000 tons.

And certainly, since that time, navigation has been on the increase ; for in 1843, England alone sent round Cape Horn three hundred vessels, of the aggregate burden of 110,040 tons : the movement out and home was then 220,080 tons. According to the “Newbury-port Herald,” a paper published in the United States, the number of whalers alone, which in 1844 were employed, for the most part, in the Pacific Ocean, amounted to six hundred and twenty-five, giving an aggregate burthen of 200,000 tons.

In 1843, the tonnage of the mercantile marine of England with China and the Philippine Islands	Tons.
was	58,901
With Austria and Oceania	65,890
Total	124,791

Giving by the double voyages 250,000 tons.

It must then be granted, that the annual trade by Cape Horn is at present 700,000 tons, and that by the Cape of Good Hope 700,000 tons. It is evident, therefore, that the Canal would give passage at least to 900,000 tons, without reckoning the certain increase in the commercial

relations which would be the consequence of the communication being rendered easier, and of the vast accession to these countries of European luxuries and industrial produce. By referring to the Appendix No. I., it will be seen how large is the trade between England and Central America, even under existing circumstances.

To ascertain what would be the tollage brought to the Company by these ships, we will adopt the calculations of Mr. Garella. According to what we have stated, it may fairly be expected that the cutting of the isthmus would shorten, on the average, by one month at least, the voyage of those European ships which would adopt this route; and by two months, the voyage of those of the United States. The economy thus resulting to the owners may be estimated as follows for a ship of three hundred tons, viz. :—

In the maintenance of the crew	£120
“ interest at $1\frac{1}{2}$ per cent. on the value of the cargo, supposed to be worth 4000 <i>l.</i>	60
“ interest at 1 per cent. on the value of the ship, supposed to be worth 3,600 <i>l.</i>	36
Total saving in the month	£216
Reduction of insurance on the ship and cargo at 1 per cent.	76
Total saving	£292
Equal to a saving of 19 <i>s.</i> 7 <i>d.</i> per ton.	

The ships belonging to the United States having their voyage shortened by two months, would gain double, that is to say, thirty-nine shillings per ton. In order, then, to treat them on the same footing as all the other nations, it would be but just to make them pay double tollage. So, by admitting only ten shillings per ton for European vessels, and twenty shillings for those of the United States, we could reckon on,—

600,000 tons, at 10 <i>s</i>	£300,000
300,000 tons, at 20 <i>s</i>	300,000
Yearly revenue of the Canal	<u>£600,000</u>

We perceive that this undertaking would bring to the shareholders a very high interest ; for, deducting two per cent. for the keeping in repair, and one per cent. for the sinking-fund, there would remain for the shareholders 12 per cent. per annum on the capital employed.

In order to develop the resources of the state of Nicaragua, and create commercial and maritime interests therein, we would suggest, that every ship bearing the flag of Central America, and having one-half of the crew, including an officer, composed of natives, should pay one-fifth less than ships of any other nation. In this way, Central America would soon possess good sailors, and a respectable commercial marine, at the expense of foreign merchants, who, with a view to the advantage offered by a reduction of tolls, would sail under the flag of Nicaragua, forming one-half of their crews of native sailors.

SECTION 2.

We have stated that the secondary profits of the Canal would arise from the increase in the value of the soil. According to our information, the government of Nicaragua would cede to the Company, all the land lying on the right and left banks of the Canal throughout its entire course, to an extent of two leagues inland, forming three hundred square leagues, or about 1,200,000 acres. These 1,200,000 acres are, at the present moment, worth 1*s*. 6*d*. per acre. The proposed gift by the government of Nicaragua to the Company is, therefore, now of the value of 90,000*l*. If we deduct from the above number 200,000 acres, as probably incapable of cultivation, and 300,000 more, that would be required for the service of

the Company, producing no income, or as concessions to its engineers, servants, &c., there will remain 700,000 acres to explore and improve. The Canal being accomplished, it will be easily granted that these lands may in all probability bear a value of at least 2*l.* per acre. Let us put it at 1*l.* per acre only, and we shall have a property of 700,000*l.*, vesting absolutely in the Company; for, we must not forget that the soil is here very fertile; that they frequently have more than two harvests a year; that the indigo produced in this country is better than that produced in the East Indies; that the tobacco is as good as at Havannah; that coffee and sugar are easily produced; that the forests are filled with Vanilla and Brazilian timber; that there are mines to work; and, finally, that the waste water thrown off by the Canallocks, would afford power for manufacturing purposes. It is then evident that, even if the Company should limit itself to the disposal of these lands, when the Canal is complete, they would derive great profit, were it only by the increase of value; but, in our opinion, there is a greater advantage to be derived from their retention.

We firmly believe, that it is important to combine, with the construction of the Canal, the project of colonization, in order that the two undertakings should assist each other; and to enlist as shareholders, the mass of emigrants who annually depart for America, and who, according to the statistical information gathered up to this day, set forth with an average sum of 20*l.* per head.*

* We read in the *Journal des Debats*, of the 3rd May, 1846, that the Society formed at New York, the 31st March, 1784, to assist the indigent Germans in the United States, celebrated on Tuesday last, the sixty-second anniversary of its foundation. On this occasion, they have published a pamphlet, which states, amongst other things, that the number of German emigrants which arrived during last year in the city of New York alone, amounted to 30,567, each of them having an average sum of 20*l.* sterling. Of these emigrants, 12,225 arrived from Havre, in seventy-eight ships; 9,647 from Bremen, in seventy-

Thus, the shares would be placed in hands most interested in the success of the undertaking; for those only, who join an enterprise for the sake of investment, and not mere gamblers, ensure the solidity of an undertaking.

The capital of 4,000,000*l*, which we presume to be necessary for the construction of the Canal, should be divided into 400,000 shares of 10*l*. each. By paying down the value of one or more shares, the emigrant shareholder would be entitled, on his arrival in America, to such accommodations as would enable him to overcome the first difficulties necessarily attendant on early steps in colonization. Every emigrant-shareholder would receive from the Company twenty acres of land to cultivate, as well as the necessary implements for that purpose.

The 700,000 acres of land would be thus distributed among 35,000 emigrants, and sold to them on the following terms:—Ten years' time would be allowed for the emigrant-shareholder to pay to the Company the price of the twenty acres allotted to him, as well as the outlay incurred by the Company in procuring him dwelling, food, and all the accommodations required. The payment should be made by annual instalments, and proportionate to the progressive increase of value likely to take place, every year, in the property.

So, the whole of the first year having been entirely taken up by preparing and tilling the ground, the emigrant-shareholder should not be made liable for any payment whatever during that time. The annual instalments should begin to be paid at the end of the second

seven ships; 3,718 from Antwerp, in twenty-five ships; 2,525 from Hamburgh, in twenty-four ships; 1,959 from Rotterdam, in thirteen ships; and 493 from Ghent, London, and Liverpool, in five ships. The greater part have taken their direction towards the Southern States. In 1814, there arrived only 17,999 German emigrants at New York.

year, and accomplished in the progressive manner indicated by the following Table :

		<i>Per Acre per Annum.</i>		
At the end of the first year		0 <i>l.</i>	0 <i>s.</i>	0 <i>d.</i>
“ “ second year		0	1	0
“ “ third year		0	1	6
“ “ fourth year		0	2	0
“ “ fifth year		0	2	6
“ “ sixth year		0	3	0
“ “ seventh year		0	3	6
“ “ eighth year		0	4	0
“ “ ninth year		0	4	6
“ “ tenth year		0	5	0
“ “ eleventh year		0	5	6
		1	12	6

So, every acre of land will procure to the Company, in the course of eleven years, a net profit of 1*l.* 12*s.* 6*d.*, and consequently, 700,000 acres of land will bring, in the above-stated lapse of time, the corresponding profit of 1,137,500*l.*

The Company would establish as many villages as would be necessary for the number of colonists. Each village would be erected on the most healthy spots, and in the vicinity of a river ; it would be composed of two hundred dwellings, each dwelling being appropriated to one family : a village would then cost—

200 dwellings, at 4 <i>l.</i> each	£ 800
Maintenance for the first six months, and seed, at 4 <i>l.</i> per family	800
Church, stores, and schools	280
Casual expenses	120
	£2000

If we divide this sum by the number of families, we shall find that the outlay will be 10*l.* per family in ten years, to be reimbursed as above stated. Now, let us suppose that in about ten years the Company has estab-

lished 175 villages, containing 35,000 families; the expense will have been 350,000*l.*, which the Company will be reimbursed by the annual progressive rate. As each of these families has been enabled to buy and pay for twenty acres of land, at the progressive rate above mentioned, the Company will have received for 700,000 acres, the sum of 1,137,500*l.*, from which, deducting 350,000*l.*, the outlay for the construction of villages, there will remain a clear profit of 787,500*l.*; exclusive of the interest received upon outlays. We must also remark, that the colonists being shareholders, will have paid 787,500*l.* to themselves, in their capacity as a company; thus, there would be a perfect amalgamation of interests between the shareholders and the colonists, who would be equally interested in the success of the undertaking. Thus, deducting this sum from the amount (4,000,000*l.*) necessary for the construction of the Canal, the Capital expended would be about 3,200,000*l.* only, bringing a net profit of 600,000*l.*, or 18 per cent., per annum.

At present, when the colonist goes to America, he finds no dwelling, no advance of capital, and often no employment: on our plan, on the contrary, by means of a share, he is sure to find, on arriving in America, a wholesome dwelling, livelihood for six months, fertile lands, and a community already settled; moreover, a part of the money paid for the purchase of his land would come back to him as a shareholder; and in about ten years his property would not only be freed from all burdens, but he might expect at that period, that both his share in the Canal and his land would be doubled in value.

Thus, our project protects all interests, the capitalist realizes large profits, and the emigrants partake of the benefit, with a moral certainty of future prosperity. This neglected country speedily changes to

flourishing towns ; its lakes are covered with fleets ; and its wealth is increased by the progress of agriculture and commerce.

Central America can emerge from her present languor only by following the example of the United States ; viz., by borrowing from Europe labour and capital for this first object. Independent of the advantages of its Geographical position, and of the fertility of its soil, the state of Nicaragua presents to European emigrants advantages which are not to be found in the United States. In the north of America, the population settled itself in the beginning on the eastern coast, gradually extending inland. As long as the uncultivated lands were not far from the sea, the European emigrants easily found employment ; but now the case is altered, and the great number of foreigners that daily arrive in the United States, become, for the following reason, a burden to the nation. The uncultivated lands where adventurers may easily find employment, are three hundred leagues from the coast, and as, in most instances, the emigrants are destitute of means to reach those remote districts, they become, in the towns on the coast, a prey to indolence and misery.

In Central America, the reverse would be the case ; the indigenous population has settled by preference on the coast of the Pacific ocean, deserting all that part situated opposite the ancient world, so that when the country is in a position to require colonists and European labourers, they may arrive through the Canal to places already inhabited ; and the population will gradually extend from the West to the East, and not, as in the United States, from the East to the West, thus getting nearer to Europe, in proportion as it increases, and offering facilities to the new colonists, till they reach the extreme borders of the country.

The prosperity of Central America is connected with the interests of civilization at large ; and the best means

to promote the welfare of humanity, is to knock down the barriers which separate men, races, and nations. This course is pointed out to us by the Christian religion, as well as by the efforts of those great men who have at intervals appeared in the world. The Christian faith teaches us that we are all brothers, and that in the eye of God, the slave is equal to the master,—as the Asiatic, the African and the Indian, are alike equal to the European. On the other hand, the great men of the earth have, by their wars, commingled the various races of the world, and left behind them some of those imperishable monuments which, in levelling mountains, opening forests, canalising rivers, has a tendency to upset these obstacles which divide mankind, and to unite men in communities, communities in people, people in nations. War and commerce have civilised the world. The time for war is gone by ; commerce alone pushes its conquests. Let us then open to it a new route ; let us approximate the people of Oceania and Australia to Europe ; and let us make them partakers of the blessings of Christianity and civilization.

To accomplish this great undertaking, we make an appeal to all religious and intelligent men, for this enterprise is worthy of their zeal and sympathy. We invoke the assistance of all Statesmen, because every nation is interested in the establishment of new and easy communications between the Eastern and Western parts of the globe. Finally, we call upon Capitalists, because, whilst they are promoting a glorious undertaking, they are sure to derive a large profit thereby.

APPENDIX, No. I.

State of the trade of Central America, according to Mr. Thompson, up to the year 1829, and of that of the town of Guatemala up to the year 1840.

We give here certain statistical information on the state of Guatemala, and a sketch of the importance of its commerce, both in imports and exports, which will be found under the following heads:—*

First. A list of the capitals, their districts, and principal produce.

Second. An extract from the report of a special commission, appointed by the government of Guatemala, with a view of showing the commercial situation of all the states of the republic.

Third. A table of the imports from 1822 to 1829 inclusive, into the different states of America, not only from England, but also from all the other states of Europe.

Fourth. An *exposé* of the state of commerce in the town of Guatemala during the year 1839, deduced from information obtained in 1840, from different merchants of Guatemala-la-nueva, names of the districts in Central America, their principal capitals, produce, &c., &c.

The five states of Central America are divided into forty-eight *partidos*, or districts, having each of them a capital. Besides these capitals, the number of towns and villages in the whole republic amounts to two hundred and fifty-three.

* The greater bulk of the information which will be found hereafter, is taken from the work published by Mr. Thompson in 1829.

The following Table will give the names of the districts, their capitals, and their produce.

The State of Guatemala is divided into thirteen districts, viz. :

Districts.	Capitals.	Produce.
Zacatepeque . .	Guatemala-nueva	{ Cochineal, cotton, common cloth, fruits.
Chimaltenango .	Chimaltenango .	{ Wheat, maize, European fruits.
Solola	Solola	{ Cattle.
Totonicapan . .	Totonicapan . .	{ Goat-hair, with which they manufacture stuffs and garments; wheat, ware, guitars, wooden tools, &c., &c.
Gueguetenango .	Gueguetenango .	{ The same produce as Totonicapan; it has also lead mines.
Guesaltenango .	Guesaltenango .	{ Idem.
Suchiltepéque .	Mazatenango .	{ Cocoa, cotton, cattle, timber, &c.
Escuintla . . .	Escuintla . . .	{ Indigo, cattle, cotton.
Chiquimula . .	Chiquimula . .	{ Gold and silver mines, cattle, horses, mules, indigo, cotton.
San Augustin . .	San Augustin . .	{ The same as at Chiquimula; cocoa, wheat, &c., &c.
Vera-Paz . . .	Cohan	{ Sugar-cane, spices, cotton, linen manufactures, dye-woods.
Salama	Salama	{ Sugar and sarsaparilla.
Peten	Remedios . . .	{ Timber of all sorts.

The State of San Salvador is divided into three districts, viz. :

San Salvador . .	San Salvador . .	{ Indigo, cochineal, cocoa, balms, saffron, cattle, cotton, cloth, saddlery, bridles of horses gilt, palm-nuts, fruits, sugar, and tobacco.
Zonzonate . . .	Zonzonate . . .	{ Cotton, wheat, cloth, indigo, cattle, hats, sugar, matting, artificial flowers made of shells, the exportation of which to Peru and Chili amounts yearly to 10,000 <i>l</i> .

Districts.	Capitals.	Produce.
San Miguel . .	San Miguel . .	{ Indigo, cochineal, cotton, leather, netting, ham- mocks, sacks made of aloes; gold and silver mines.
San Vincente . .	San Vincente . .	
		{ The same produce as at San Miguel.

The State of Honduras is divided into twelve districts, viz. :

Comayagua . .	Comayagua . .	{ Gold, silver, copper, and iron mines.
Tegucigalpa . .	Tegucigalpa . .	
Choluteca . .	Choluteca . .	Same produce.
Macaome . .	Macaome . .	Same produce.
Cantaranas . .	Cantaranas . .	Same produce.
Juticalpa . .	Juticalpa . .	Same produce.
Gracias . .	Gracias . .	{ Wheat, sugar, indigo, to- bacco, precious stones.
Los Llanos . .	Los Llanos . .	
Santa Barbara . .	Santa Barbara . .	Same produce.
Truxillo . .	Truxillo . .	Same produce.
Lloro . .	Lloro . .	Same produce.
Segobia, or So- moto . . }	Segobia, or So- moto . . }	{ Naptha, tobacco, cattle, and silver mines.

The State of Nicaragua is divided into eight districts, viz. :

Leon . .	Leon . .	Indigo, timber, cattle, &c.
Grenada . .	Grenada . .	Same as above, and cocoa.
Managua . .	Managua . .	Ditto.
Realejo . .	Realejo . .	Ditto.
Sutiaba . .	Sutiaba . .	Ditto.
Massaya . .	Massaya . .	Do. and manufactured hats
Nicaragua . .	Nicaragua . .	Do., cocoa, &c.
Matagalpa . .	Matagalpa . .	Wheat and cattle.

The State of Costa Rica is divided into eight districts, viz. :

San Jose . .	San Jose . .	{ The state of Costa-rica possesses gold, silver, and copper-mines.
Cartago . .	Cartago . .	
Ujarras . .	Ujarras . .	
Borrica . .	Borrica . .	
Iscan . .	Iscan . .	
Alajuela . .	Alajuela . .	
Eredia . .	Eredia . .	
Bogases . .	Bogases . .	

The state of Guatemala named a commission, in order to examine the situation of the commerce of the republic. It was directed that the inquest should only have in view, to ascertain the commercial movement during the five years which preceded and followed the declaration of its independence in 1823.

The report of this commission states, that the commerce with Spain consisted only in annual exports of 8,500 tercios* of Indigo, representing a value of 2,000,000 dollars (£400,000 sterling) and in the export of a great quantity of cochineal, on the importance of which, the report is silent. In return for these two articles, Spanish goods were imported.

There existed an order by which it was prohibited to import a greater amount of goods, than those exported.

During the five years which preceded the declaration of Independence, the exports were reduced to half of what they had been. They amounted only to 1,000,000 dollars (200,000*l*). In 1825, the balance was established again, and the exports of Indigo were as high as 2,000,000 of dollars (400,000*l*.)

Mr. Thompson having obtained from the government the right of examining this report, extracted from it the following table, which he has published.

In order to give an idea of the commercial movement in general, he has selected the necessary documents out of the years 1824 and 1825, but as the commission had neglected to mention the value of some of those articles, although it had pointed them out, Mr. Thompson, in order to render his work as complete as possible, has filled up this gap with information, the authenticity of which is beyond question, and particularly with regard to that supplied by Don Juan de Mayorga, minister of Mexico.

* Every tercio is = to 130 pounds.

He has completed the work of the commission by giving a double table. The first contains those articles, the importance of which had been mentioned by the commission. The second contains those merely spoken of, to which Mr. Thompson has annexed a value.

TABLE
OF THE ARTICLES EXPORTED FROM THE STATE OF
GUATEMALA.

Extract from the Report of the Commission.

Articles chosen indiscriminately in the years 1824 and 1825, the value of which has been mentioned.

Indigo (1824)	.	.	.	.	£ 400,000
Hides (1824)	.	.	.	.	6,000
Balms (1829)	.	.	.	.	39,000

Extract from the above-mentioned Report.

Articles, the value of which is indicated by
Mr. Thompson.

Cochineal (1829).	.	.	.	.	£ 500,000
Gold and silver	.	.	.	.	200,000
Iron	.	.	.	.	6,000
Lead	.	.	.	.	2,000
Papalillo.	.	.	.	.	2,000
Sarsaparilla	.	.	.	.	2,200
Coffee	.	.	.	.	600
Cotton	.	.	.	.	100,000
Cocoa	.	.	.	.	300,000
Tobacco	.	.	.	.	40,000
Sugar	.	.	.	.	10,000
Pepper	.	.	.	.	2,000
Corn	.	.	.	.	20,000
Drugs and medicinal plants	.	.	.	.	17,000
Pitch and tar	.	.	.	.	1,000
Cattle	.	.	.	.	4,000
					£ 1,651,800

From this table we may infer, that the general commerce of Guatemala had risen in 1829, to a sum of 3,300,000*l.*, which supposes a quantity of goods imported, equal to a sum of 1,700,000*l.*

Now, as the consumption of that period is considered to be half of English goods, the English trade would only be 850,000*l.* a year. This calculation is certainly erroneous, because in the colony of Belize, the principal entrepôt of English goods for Central America, the capital employed in the trade was as high as 2,000,000*l.*

With a view of giving more exact information, Mr. Thompson sets forth a table of the trade between Jamaica, and Guatemala, as well as between Belize and England.

This table shows that the merchants of Jamaica supply annually those of Guatemala with goods to the amount of 495,000 <i>l.</i> , and that they receive in exchange, Indigo and Cochineal, 500,000 <i>l.</i> , which brings the commerce between Guatemala and Jamaica to		£945,000
Goods are annually forwarded from England to Belize, to the value of		1,650,000
For which, English commerce receives in return Indigo and Cochineal		1,500,000
Mahogany		400,000
Other produce		200,000
Total amount of commerce between Guatemala and England		£ 4,695,000

We must observe, that this was published in 1829, and Mr. Thompson remarked, that the commerce of Belize had, at that period, considerably increased. Commission houses having established themselves, this new intercourse was certain to become extensive. To speak of this port alone, which contained ships of such construction, as enabled them to pass the bar of the river Dulce, it was in constant communication with Izabal, a port

situated on the gulf of Dulce, from whence merchandise is forwarded to Guatemala and *vice versâ*.

Belize is then, according to Thompson, the only intermediate point between Europe and Central America, but if we take into consideration its situation and means of communication with the interior of Guatemala, it will be readily acknowledged that, ere long, Santa Thomas will deprive Belize of its present importance.

Before quitting Central America, Thompson made, in 1829, a table of the trade of all the new republics with the rest of the world. He states, that, having obtained the best information in his power on his return to England, he can safely say, that his calculations were as accurate as the matter would allow. He adds, that the commerce of England with these republics, chiefly consists in woollen cloths of every description, cotton stuffs, ironmongery, and sundry other articles; and that France and Spain are in possession of the silk, glass, jewellery, wine and spirit trade. The supplies of these last two articles to Guatemala is of little importance, owing to the difficulties which the carriage by land presents.

The town of Guatemala, according to Mr. Thompson, receives through the port of Zonzonate immense quantities of goods from China, whence the abundance is such, that it renders them of little value. They are generally worn by the middle classes.

The Spaniards having lost the monopoly, since the declaration of independence, the consumption of European goods at Guatemala had experienced a very considerable diminution in price; but, owing to the trade being declared free, the consumption has considerably increased.

Resuming the calculations he made in 1829, Mr. Thompson calls attention to this fact, that the value of goods exported from Great-Britain to the new republics, represented an average yearly sum of 10,000,000*l*. He

adds, that the actual exports (1829) attained 12,000,000*l*. These calculations are grounded on the following Tables ; and he says that, according to the official extracts taken at the English custom-house, the exports of England to the new republics were, in 1824 —

To the Brazils	£ 3,425,324
To Spanish America	2,377,100
To the same destination, passing by the West Indies	4,197,576
Total exports of Great Britain to the new republics of America	10,000,000
According to the table published by the French ministers in the month of May 1829, France had exported to the new republics, goods to the amount of	640,000
The United States had exported	3,330,000
Spain, Germany, and the other parts of Europe	4,480,000
China and the East Indies	1,150,000
	£ 19,600,000

It is therefore evident, that as early as 1825 the consumption of foreign-manufactured produce in the different republics of South America amounted nearly to 20,000,000*l*., out of which, one-sixth, at least, was absorbed by the state of Guatemala. Since that time, the consumption has still been increasing ; and, were we in want of positive information to show the progress of the trade of the town of Guatemala, Mr. Thompson's statements on the subject would suffice to prove it, particularly as he was secretary of the Mexican commission dispatched there in 1823 by the minister Canning, with a view to an inquiry into the trade of these new republics.

He begins, by comparing the trade of England with Mexico, Columbia and Buenos Ayres,—first, in the year 1822, during which time the Commission was on its way there, and then in 1825, during its stay in the republics.

The exports from England were :

	1822.	1825.
To Mexico . . .	£ 90,000	£ 1,400,000
To Columbia . . .	27,000	650,000
To Buenos-Ayres . . .	230,000	1,600,000
	347,000	
	3,303,000	
	£ 3,650,000	£ 3,650,000
Increase	£ 3,303,000.	

Thus, it appears that the journey of this Commission to Mexico, had the effect of raising the trade between England, Mexico, Columbia, and Buenos Ayres, from 350,000*l.* to 3,650,000*l.*; an increase of nearly nine-tenths, and that in three years, with regard to this country only. From 1822 to 1825, then, it succeeded in increasing the exports from England 3,303,000*l.* The services rendered by the Company have not been limited to that result only, for the exports of England to all the republics of Central America have amounted, from 1823 to 1827, to the enormous sum of 32,875,855*l.* In the supposition that the English trade may have realised, on these operations, a profit only of ten per cent., which is the least to be calculated, the private property of the Republics is indebted to the active solicitude of the English government for an increase of 3,287,585*l.* realised in four years; and that, at a moment when the excess of manufactured produce rendered new markets necessary.

ADDENDUM TO APPENDIX No. I.

The following has been extracted from a report made by the vice-consul, Mr. Foster, in 1827.

The import trade of this state (Nicaragua) and the country in general, has not suffered so much as might have been expected, from the very severe visitation of cholera during this year.

The prices of foreign manufactures have now found their level in these markets, and the consumption of those articles used by the poorer classes, has increased in a wonderful degree, both in quantity and quality; and the demand for foreign manufactures (of which British cottons of inferior quality have a prominent part) will naturally go on at an increased ratio.

The foreign imports may be classed under the following heads:—

British—consist of calicoes, printed cottons, domestic or grey and power-loom shirtings, linen and cotton mixed, or unions, linen, muslins, hosiery, hard earthenware, iron, steel, lead, powder, &c. &c.

French—consist of silks, printed cottons, cambrics, wine, spirits, jewellery, and fancy articles.

United States—consist of domestic cottons, soap, sperm candles, hardware, spirits of inferior quality, and powder.

Spanish—consist of paper, silk, ribbon, wine, oil, spirits, &c.

Germany—consist of osnaburgs, glassware, wax, furniture, hardware, steel, wine, &c.

Italy—consist of paper, oil, silk, liqueurs.

Colombia—consist of cocoa, and straw hats.

Peru—consist of zerga (a coarse woollen cloth), tin, spirits, and common sweet wine.

Chili—consist of sweet wine, pellones.

The value of British goods imported may be taken at two-thirds of the whole of the imports.

The consumption of French goods, being principally articles of luxury, are chiefly confined to the cities of Guatemala, San Salvador, Granada, &c. German lincens, shirtings, and glassware articles of general consumption. In Spanish goods, with the exception of ribbons, the imports are trivial. They have given way to those of France and Italy.

The sickness of this year has had considerable influence on the exports. Cochineal and indigo form the principal; great quantities, particularly of the former, are shipped from the ports on the northern side of Honduras. From the ports of the Pacific, fifteen hundred serons have been exported during the year, to Europe, and the ports of Peru and Chili. (In the interior of both these countries, a great quantity of indigo is consumed.) Hides, horns, sarsaparilla and balsam, for Europe and the United States, and mahogany, cedar, and sugar for Chili and Peru. These form the principal articles of the export trade; which, in proportion to the imports, is on the increase. Brazil wood, with which this state, as well as Costa Rica, abounds, formerly afforded employment to a great number of British vessels. The fall of this article in the home markets, has, for the present, caused it to be but little sought for.

In agriculture, this state is rapidly improving. In addition to indigo, sugar, cocoa, wheat, rice, &c. &c., coffee and cotton are now better attended to, but more particularly cotton and indigo. The former, which is much esteemed, and known in the European market as "green seeded," is an annual plant. The staple is short, which defect is overbalanced by its superior texture, and it is peculiarly adapted to certain manufactures.

New arrangements in the tariff are about to take place, but the present state of revolution must suspend any remark upon the question.

The province of Nicaragua has the advantage of diversity of climate, the plains in the vicinity of the large towns of Leon, Granada, and Nicaragua being tropical, and the heights nearing the lakes from the Pacific, as Chocoyos, Natagalpa, and Segovia, being temperate, whilst, in the region about Honduras, it is generally cold even for an European.

The soil is everywhere fertile and capable of yielding every species of produce of corresponding temperature. Mines also exist, but are not worked for want of capital, and population;

particularly as the plains afford abundance of nutriment to the limited population at very trifling labour.

The seasons are periodical with trifling variation. The summer, or dry season, commences in the early part of November; and the winter, or wet season, in the latter end of April, or beginning of May. The summer is perfectly dry, at which time commercial intercourse is carried on, which, during the winter, particularly at the latter end, becomes difficult on account of the impassability of the roads.

It is during the winter that the agriculturist commences his labours, and during the months of September and October, that the rains are excessive.

The climate is considered generally very healthy, although, intermittent fever, by neglect, degenerates into typhus: there are no epidemical diseases peculiar to it. The health of the natives, as well as that of the Europeans, is influenced at the change of the season. Any important deviation may be traced to neglect or excess, particularly as regards foreigners.

The temperature in the shade ranges from seventy to ninety degrees, in the plains near the sea coast.

The internal commerce of the country is facilitated by good cart-roads in the plains, which are practicable (even in their neglected state) from the south Pacific to the town of Granada, on the lake of Nicaragua.

APPENDIX, No. II.

Comparison between voyages to be made through the Canal of Nicaragua and those actually made viâ Cape Horn, and the Cape of Good Hope.

The following documents, which we reproduce with only a few alterations, have been kindly given to us by Mr. Wittich, a professor at the London University.

§ 1.—*From England to Valparaiso, viâ Cape Horn.*

	Distance in miles.	Days requi- red.
From England (Plymouth) to the Canaries	1400	14
[Variable winds ; south-westerly and north-westerly prevail. A regular current, of moderate strength, south of 42° N. lat., sets towards the south.]		
From the Canaries to the region of the Calms, or 6° N. lat., leaving the Cape Verde Islands to the eastward	1500	14
[North-easterly trade-winds ; not quite regular, nor blowing always with force. Current running with considerable force south or south-west.]		
From 6° N. lat., to the equator, through the region of the Calms	360	8
[The region of the Calms varies from 2° to 10° of lat., in width ; its average breadth is 5½°. Calms, interrupted by squalls. It takes commonly eight days to pass through it.]		
From the equator to Cape Frio	1500	14
[South-east trade in winter, interrupted frequently by north and north-westerly winds. Near the equator, the equatorial current running west ; and in certain seasons, with great force south of 8° S. lat. The Brazil current setting south, moderate.]		

	Distance in miles.	Days— requi- red.
From Cape Frio, to 40° S. lat	1100	12
[Variable winds ; north westerly and south-wes- terly prevail at certain seasons ; and at others, north- easterly. Slight current setting to the south.]		
From 40° S. lat. to Staatenland	1000	13
[Very variable winds ; gales from the west. Cur- rent running northward with moderate force. Slow navigation (Capt. King).]		
From the eastern Cape of Staatenland to 60° S. lat. and 65° W. long., and thence round Cape Horn to 89° W. long.	840	21
[South-westerly and north-westerly winds prevail greatly, and blow with great force, except in June and July, when easterly winds are frequent. Cur- rent setting to the east, and sometimes with con- siderable force.]		
From 85° W. long. and 60° S. lat., to 40° S. lat., close to the meridian of 85°	1250	16
[North-westerly and south-westerly gales prevail to a great extent. The current is slight, and sets com- monly southward.]		
From 40 S. lat. to Valparaiso	450	5
[Southerly winds are almost continual during the summer ; in winter, northerly winds prevail to some extent. Current running to the north-west moderate.]		
	9400	117

§ 2.— *From England to Valparaiso, via the proposed
Canal.*

From England to 28° N. lat. and 30° W. long. .	1600	16
[Variable winds ; south-westerly and north-wes- terly prevail. A slight current south of 42° N. lat., setting to the southward.]		
From 28° N. lat. and 30° W. long., to the Straits between the Island of San Lucia and Saint Vincent	2200	16
[North-easterly trade less regular and weaker to- wards the old continent, but stronger and more re- gular near America. Setting westward.]		

	Distance in miles.	Days requi- red.
From the strait of San Lucia to San Juan de Nicaragua	1400	13
[Easterly and north-easterly trade-winds in winter, blowing with force ; in summer, light, and interrupt- ed by westerly winds. Current setting westward, moderate.]		
Passage through the Canal	278	2
[Towing by steam-power through the canal and river, and sailing through the lakes.]		
From Realejo to Guayaquil	1100	20
[Very variable winds, commonly light ; those from the south more frequent than others ; frequent calms, but of short duration. A current setting south- westward from Panama bay to Galapagos.]		
From Guayaquil to Callao	900	18
[The track of the vessel along shore. Southerly winds of moderate strength. Current setting along the shore to the northward ; moderate, slow naviga- tion.]		
From Callao to Valparaiso	1500	21
[The prevailing winds, from south south-east to south-west ; interrupted only by calms, which some- times continue for three or four successive days ; in winter, by light northerly winds. A moderate cur- rent sets northward along the coast. The track of the vessel does not lie along the shore, but runs off to the south-easterly trade-winds ; and, by their aid, the parallel of Valparaiso is obtained.] [The ave- rage passage from Callao to Valparaiso is about three weeks (Usborne).]		
	8978	106

§ 3. *Homeward Voyage—Valparaiso to England, viâ
Cape Horn.*

From Valparaiso to 40° S. lat.	460	15
[Southerly winds are almost continual during the summer, and in winter they alternate with northerly winds. A moderate current is running to the south- west ; as the winds are commonly light and inter- rupted by calms, the navigation is very slow.]		
From 40° S. lat., to Cape Pilaes.	800	8
[North-westerly and south-westerly winds prevail to a great extent, and blow frequently in gales. A slight current runs along the coast southward.]		

	Distance in miles.	Days requi- red.
From Cape Pilares to the Strait of Lemaire . [Westerly and south-westerly winds, except in June and July, when those from the east prevail. Current setting to the east, moderate.]	600	5
From Strait Le Maire to 40° S. lat. [Variable winds, mostly from the west of the me- ridian; north-westerly gales. Current setting north- ward, with moderate force.]	1000	13
From 40° S. lat. to Cape Frio [Very variable winds, shifting frequently in a day to all points of the compass, and interrupted by calms; north-easterly gales. Slight current setting to the south.]	1100	14
From Cape Frio to the equator [South-east trade, but frequently interrupted by north-easterly and north-westerly winds, especially from November to April. Current setting to the south, and with some force.]	1500	15
Passage through the regions of the Calms . . . [Calms interrupted by short squalls, commonly from north-west and north-east.]	360	8
From the region of the Calms to 30° N. lat., and 40° W. long., in a north-north-west direction. [North-west trade, sometimes interrupted by north-westerly winds. Slight current setting to the north-west.]	1700	17
From 30° N. lat. and 40° W. long. in a north- east direction to Plymouth, passing east of the Azores [Variable winds; south-westerly and north-wes- terly prevail.]	1340	12
	8860	107

§ 4. *Homeward Voyage—Valparaiso to England,
through the proposed Canal.*

From Valparaiso to Callao	1500	12
[Southerly winds, varying between south-south- east and south-west, in summer interrupted by calms, in winter, by light northerly winds. Current setting to the north with force.]		

	Distance in miles.	Days requi- red.
From Callao to Guayaquil	900	8
[Southerly winds, constant, and sometimes blowing with force. A current of considerable force setting to the north-west.]		
From Guayaquil to Realejo	1100	11
[Variable and light winds. Those from the south and south-east prevail. Short calms. Slight current setting to the south-west.]		
Passage through the Canal	278	2
From San Juan de Nicaragua, to the windward passage	650	7
[In the Caribbean sea, easterly and north-easterly trades are always met with.]		
From the Windward to Plymouth	3600	36
	8028	76

§ 5. *From England to Callao, viâ Cape Horn.*

From England to Valparaiso (as before) . . .	9400	117
[See § 1.]		
From Valparaiso to Callao	1500	13
[Southerly winds in summer, commonly light and frequently interrupted by calms; in winter alternating with northerly winds, also light. Current setting along the shores northward. Quick and easy navigation.]		
	10900	130

§ 6. *From England to Callao, viâ the Proposed Canal.*

From England to San Juan de Nicaragua . . .	5200	45
[See § 2.]		
Passage through the Canal	278	2
From Realejo to Callao	2000	38
[See § 2.]		
	7478	85

§ 7. *Homeward Voyage from Callao to England, viâ Cape Horn.*

From Callao to Valparaiso	1500	21
[See § 2.]		
From Valparaiso to England	8860	107
[See § 3.]		
	10360	128

§ 8. *Homeward Voyage from Callao to England, viâ the proposed Canal.*

	Distance in miles.	Days requi- red.
From Callao to Realejo	2000	19
[See § 4.]		
Passage through the Canal	278	2
From San Juan de Nicaragua to England . .	4250	42
	6528	63

§ 9. *From England to the Oregon Territory, viâ Cape Horn.*

From England to Callao	10900	180
[See § 5.]		
From Callao to Oregon	3000	30
	13900	160

§ 10. *From England to Oregon, viâ the proposed Canal.*

From England to Realejo	5478	47
From Realejo to Oregon	2700	27
	8178	74

§ 11. *From England to Sydney, viâ the Cape of Good Hope.*

From England (Plymouth) to the Canaries. .	1400	14
[Variable winds; south-westerly and north-westerly prevail. A regular current of moderate strength is found south of 42° N. E., setting south.]		
From the Canaries to the region of Calms . .	1500	14
[North-east trade, not very regular, nor blowing always with force. Current running with considerable force south or south-west.]		
Through the region of the Calms	360	8
[This region extends at an average 5° and a half in width, and it commonly takes eight days to pass it, as the continual calms are only interrupted by short, though frequent squalls.]		
From the equator to the island of Trinidad .	1220	11
[South-east trade, blowing rather from the eastern quarter, steady; but in winter frequently interrupted by north-westerly and northerly winds. Near the equator a Current running west, and at times with great rapidity.]		

	Distance in miles.	Days requi- red.
From Trinidad to the Cape, passing north of the island of Tristan d'Acunha	3250	28
[As far as 28° S. lat., the south-east trade with a westerly drift current ; south of 28° S. lat. variable winds, among which, those from the west prevail greatly. East of Tristan d'Acunha, a moderate current setting to the east.]		
From the Cape to Bass' Strait, between 38° and 40° S. lat.	5850	53
[Variable winds ; westerly and north-westerly prevail, and blow commonly with great force. A moderate current running eastward, as far as 50° E. long.]		
From Bass' Strait to Sydney	450	5
[Very variable winds ; frequent changes. Current setting in winter southward, and in summer northward.]		
	14030	133

§ 12. *From England to Sydney, via the proposed Canal.*

From England to Realejo, through the Canal	5478	47
[See § 6.]		
From Realejo to the Galapagos Islands	750	8
[Slight winds and calms near the continent ; variable winds in the open sea, mostly from the south and south-east. Current setting south-west, with considerable strength.]		
From the Galapagos, past the Marquesas, to 150° W. long.	3600	22
[Constant south-east trade, blowing with considerable force. Current running west or south-west, with strength.]		
From 150° to 180° W. long. and 25 S. lat. south-westward, through the sea, separating the Society, Archipelago, and Cook's Islands on the one side, from the Navigation and Friendly Islands on the other	2000	13
[South-east trade, rather steady and regular. Drift current, running westward.]		
From 180° W., and 25° S. lat., to Sydney	2000	15
[South east trade ; afterwards, variable winds ; but those from the east and south prevail. Weak currents, setting in different directions.]		
	13828	105

§ 13. *Homeward voyage—Sydney to England, via the Cape of Good Hope.*

	Distance in miles.	Days requi- red.
From Sidney to South-west Cape, in Tasmania .	700	9
[Variable winds ; westerly and north-westerly prevail to some extent. Moderate current, running in summer to the north, and in winter to the south.]		
From North-west Cape to 110° E. long., between 42° and 36° S. lat.	1800	21
[Variable winds ; westerly and northerly prevail, but not to a great extent. Current setting eastward.]		
From 110° E. long. to 85° E. long., between 36° and 28° S. lat.	1440	18
[Variable winds ; westerly prevail, but not to a great extent.]		
From 85° E. long. to 50° E. long., between 28° and 24°	1950	13
[South east trade, constantly and commonly flowing with force. Slight current running west.]		
From 50° E. long. to the Cape	1810	17
[Variable winds ; easterly and north-easterly prevail, but not to a great extent. Current setting to the west.]		
From the Cape to St. Helena	1700	12
[North-westerly and westerly winds prevail south of 28°, and north of that parallel ; south-easterly trade-winds, hanging for the most part to the south, and even to the south-west. Slight current, setting to the north-west.]		
From St. Helena to the equator	1400	9
[Constant south-east trade. Slight current, setting to the north-west ; near the line, a strong current setting to the west.]		
Through the region of the Calms	360	8
[See § 11.]		
From the region of the Calms to 30° N. lat. and 40° W. long.	1700	17
[North-east trade, sometimes interrupted by north-westerly winds. Slight current running to the north-west.]		

	Distance in miles.	Days requi- red.
From 30° N. lat. and 40° W. long. to Plymouth [Variable winds; south-westerly and north-westerly prevail.]	1340	12
	14200	136

§ 14. *Homeward voyage—Sydney to England, viâ
Cape Horn.*

From Sydney, round Cape Horn, to the Strait of Le Maire, passing south of New Zealand .	6830	57
[Variable winds; mostly from the west and north-west. In the middle of the Pacific a current setting north-east, occupying 1500 miles in width.]		
From the strait of Le Maire to 40° S. lat. . . .	1000	13
[See § 3.]		
From 40° S. lat. to Cape Frio	1100	14
[See § 3.]		
From Cape Frio to the equator	1500	15
[See § 3.]		
Passage through the Calms	360	8
[See § 3.]		
From the Calms to 30° S. lat. and 40° E. long. .	1700	17
[See § 3.]		
From 30° lat. and 40° W. long. to Plymouth .	1340	12
	13830	136

§ 15. *Homeward voyage—Sydney to England, viâ the
proposed Canal.*

From Sydney to 120° W. long., between 36° and 33° S. lat., passing to the north of New Zealand	4500	38
[Variable winds; westerly and north-westerly prevail greatly.]		
From 120° W. long., north-eastward to the shores of America, near Coquimbo	2520	23
[Variable winds; easterly and south-easterly prevail to some extent. Current setting to the east with moderate force.]		
From the parallel of Coquimbo to Callao . . .	1800	11
[Southerly winds; varying between south, south-east, and south-west; in summer interrupted by calms, and in winter by light northerly winds. Current setting to the north, with strength. The track lies close in shore.]		

	Distance in miles.	Days requi- red.
From Callao to Guayaquil	900	8
[See § 4.]		
From Guayaquil to Realejos	1100	11
[See § 4.]		
Passage through the Canal	278	2
From San Juan de Nicaragua to Windward Pas- sage	650	9
[See § 4.]		
From Windward Passage to Plymouth	3600	36
[See § 4.]		
	14848	138

§ 16.—*Voyage from England to Canton, viâ the Cape of Good Hope, during the season of the south-west monsoon.*

From England to the Cape, along the coast of Brazil, passing near Trinidad and Tristan d'Acunha	7730	75
[See § 11.]		
From the Cape to 105° E. long, between 39° and 35° S. lat.	4320	36
[Variable winds ; westerly and north-westerly pre- vail to a great extent. Current setting east to 50° E. long., with force.]		
From 35° S. lat. to Anjier Point in Sunda Strait [South-east trade to 15° N. lat., and north of that parallel, south-east monsoon. Current setting north- west.]	1740	12
From Anjier Point to Canton, through the Chi- nese sea	1800	14
[South-east monsoon ; frequent short calms in the southern part, between Sumatra and Borneo.] [The average voyage from Sunda Strait to Canton is fourteen days.]		
	15590	137

§ 17.—*Voyage from England to Canton, viâ the Cape of Good Hope, in the season of the north-east monsoon.*

From England to the Cape	7730	75
[See § 16.]		

	Distance in miles.	Days requi- red.
From the Cape, past the islands of Amsterdam and St. Paul to 110° E. long., and 32° S. lat. [Variable winds ; near the Cape south-easterly winds prevail, but past 40° E. lat., the prevailing winds are from west and north-west. Current set- ting eastward to 50° E. long.]	4620	42
From 110° E. long. and 32° S. lat. to Allas Strait, between Lomboch and Sumbama	1560	15
[From 28° to 15°, within the region of the south- east monsoon, but near the continent of Australia it blows commonly from south-west between 15°, and Allas Strait, the north-west monsoon.]		
From Allas Strait, through Sallayes Passage to Pitts Strait	1230	17
[North-west monsoon. Strong current setting south-east and south.]		
From Pitts Strait to the Pellew islands	540	11
[In the region of the Calms, the winds are varia- ble ; but blow chiefly from the westward. With a very slight current running to the east.]		
From the Pellew islands to Balingtang Strait	600	9
[North-east monsoon. Current setting with force to the south-west.]		
From Balingtang Strait to Canton	600	6
[North-west monsoon. Strong south-western cur- rent.]		
	16880	175

§ 18.—*Voyage from England to Canton, viâ the proposed
Canal during the north-east monsoon.*

From England to Realejo through the Canal	5478	47
[See § 12.]		
From Realejo to Canton, between 10° and 20° N. lat., through Formosa Strait	10360	64
[North-east trade, north-east monsoon. Current setting to the west, and frequently with force.]		
	15838	111

§ 19.—*Voyage from England to Canton, viâ the proposed
Canal in the season of the south-west monsoon.*

From England to Realejo through the Canal	5478	47
---	------	----

	Distance in miles.	Days requi- red.
From Realejo to the Ladrões	8600	54
[North-west trade wind. Moderate current setting westward.]		
From the Ladrões to the Strait of Balintang .	1200	12
[South-west monsoon west of 138° E. long. Current running westward with some force.]		
From Balintang Strait to Canton	600	7
[South-west monsoon. Current setting to the north with moderate force.]		
	15878	120

§ 20.—*Homeward Voyage—Canton to England, via the proposed Canal during the south-west monsoon.*

From Canton to Formosa Strait, and then to 30° N. lat., and 139° E. long.	1180	7
[South-western monsoon, blowing with considerable force. Strong current setting to the north-east.]		
From 135° E. long. to 120° W. long., and between 30° and 35° N. lat.	5250	48
[Variable winds; south-westerly and westerly prevail to some extent.]		
From 120° W. long. and 30° N. lat. to Realejo .	3600	30
[Variable winds; northerly, north-westerly, and north-easterly are most frequent; gales occur frequently. A rather strong current runs from December to April south-east, and from May to November, north-west.]		
Passage through the Canal	278	2
From San Juan de Nicaragua to Plymouth .	4250	42
[See § 8.]		
	14558	129

§ 21.—*Homeward Voyage—Canton to England, via the Cape of Good Hope, in the season of the north-east monsoon.*

From Canton through the Chinese sea, to the Equator	1320	9
[North-east monsoon blowing with force. Strong current setting to the south-west.]		

	Distance in miles.	Days requi- red.
From the Equator through Sunda Straits, to 12° S. lat.	750	5
[North-west or west monsoon ; short calms in the sea between Borneo and Sumatra. Current running south with force.]		
Through the region of the south-east trade to 27° S. lat., and 50° E. long.	8200	21
[South-east trade, veering much to the east, but sometimes weak and interrupted. Current setting to the west, moderate.]		
From 27° S. lat. and 50° E. long. to the Cape . .	1560	14
[Variable winds ; south-easterly and southerly pre- vail. Current setting to the west and south-west.]		
From the Cape to Plymouth	6500	58
[See § 13.]		
	13330	107

§ 22.—*Homeward Voyage—Canton to England, via the
Cape of Good Hope, during the south-west monsoon.*

From Canton to the Straits of Formosa . . .	480	4
[South-west monsoon. Current setting to the north-east.]		
From the Straits of Formosa to Pitts Strait, pass- ing near the Pellew Islands	1800	16
[South-west monsoon. Current running north- east, near the equator with force.]		
From Pitts Strait to Allas Strait	1200	12
[South-east monsoon. Current setting to the north.]		
From Allas Strait to 27° S. lat. and 50° E. long.	3900	26
[South-east monsoon, and south-east trade ; both veering round to the east.]		
From 27° S. lat. and 50° E. long. to the Cape . .	1560	14
From the Cape to Plymouth	6500	58
	14940	130

§ 23.—*Voyage from England to Singapore, viâ the proposed Canal, during the north-east monsoon.*

	Distance in miles.	Days requi- red.
From England to San Juan de Nicaragua	5200	45
Passage through the Canal	278	2
From Realejo to Balingtang Strait	9900	62
[North-east trade to the Ladrões, and afterwards North-east monsoon. Current setting to the west, and running at some places with force.]		
From Balingtang Strait to Singapore	1200	8
[North-east monsoon. Current running south- west with force.]		
	16578	117

§ 24.—*From England to Singapore, viâ the proposed Canal, during the south-west monsoon.*

From England to San Juan de Nicaragua	5200	45
Passage through the Canal	278	2
From Realejo to the Ladrões	8600	54
[North-east trade. Current setting to the west.]		
From the Ladrões to Pitts Strait	680	7
[First, north-east trade; then south-west mon- soon; short calms. Current running in different directions.]		
From Pitts Strait through Salayes Passage, to Gaspar Strait	2600	19
[South-east or east monsoon; westerly current. Very dangerous navigation.]		
From Gaspar Strait to Singapore	380	4
[South-east monsoon—weak; calms.]		
	17738	131

§ 25.—*Voyage from England to Singapore viâ the Cape of Good Hope, during the south-west monsoon.*

From England to the Cape	7730	75
[See § 17.]		
From the Cape to Anjier Point in Sunda Strait	6060	48
[See § 16.]		

	Distance in miles.	Days requi- red.
From Anjier Point to Singapore	560	5
[South-east monsoon ; weak ; calms.]		
	14350	128

§ 26.—*Voyage from England to Singapore, via the Cape of Good Hope, in the north-east monsoon.*

From England to the Cape	7730	75
From the Cape past the Islands of Amsterdam and St. Paul to 105° E. long., and between 39° and 30° S. lat.	4320	39
From 105° E. long. and 35° S. lat. to Anjier Point [South-east trade to 15° N. lat., and north of that parallel, north-west.]	1740	17
From Anjier Point to Singapore	560	6
	14350	137

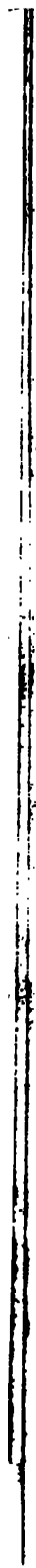
[North-west monsoon ; current setting south-west.]

(See the recapitulation on the Map No. I.)



London : Mills and Son, Printers, Crane-court, Fleet-street.







Stanford University Libraries



3 6105 027 069 686

CECIL H. GREEN LIBRARY
STANFORD UNIVERSITY LIBRARIES
STANFORD, CALIFORNIA 94305-600
(650) 723-1493

grncirc@sulmail.stanford.edu

All books are subject to recall.

DATE DUE

JUN 16 2002

JUN 16 2002

